

FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

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EDITORIAL COMMENT.

"A Warning to Pilots." Elsewhere in this issue, Mr. Harris Booth calls attention to what is apparently a defect in the pitot tube type of air speed indicator which is used on aircraft to determine the speed of the machine relative to the air through which it is moving, and he attributes the difference of opinion that exists at the present time as to the utility of an air speed indicator, as a safeguard against such accidents as may ultimately be caused through a pilot stalling his machine, to the incorrect reading given by the instrument.

For the benefit of our readers who may not be conversant with the construction of the pitot tube type of indicator, it may be observed that it consists of a U tube partly filled with a suitable liquid, one limb of which is in communication with a small orifice facing the air stream, and the other limb with an orifice at right-angles to the direction of the flow of air. In still air, the level of liquid is the same in both limbs, since the atmospheric pressure acts upon each column; but in moving air, while the latter is unaffected by the velocity

of the air passing by the orifice, the former is subjected to the pressure caused by the air impinging upon the mouth of the orifice. Thus, the difference in the level of liquid in the two limbs of the U tube is due to the forward velocity of the machine relative to the air; and from the fundamental formula for the flow of air, the head of liquid is proportional to the square of the velocity.

There cannot be the slightest doubt concerning the accuracy of the instrument for measuring the speed of the air or of other fluids moving with uniform velocity, and it has been employed for this purpose in experimental and practical work all over the world; and provided that the plane containing the U tube is set at right-angles to the direction of motion and the apparatus is not subjected to a vertical acceleration—either positive or negative—it may be relied upon to give correct readings, even in gusty winds. But, if the forward velocity is accelerated or retarded from any cause, and the plane containing the U tube is in the direction of motion, the small quantity of liquid in the horizontal portion of the U tube will tend to lag behind, or be urged forward, by the accelerating force, thus destroying the accuracy of the instrument. Similar remarks apply should the indicator receive a vertical acceleration, but as Mr. Booth discusses this in his article, it is unnecessary to enter upon the matter in this column.

It may be pointed out that the question of lag, due to the viscosity of the liquid employed in the instrument or to other causes, cannot enter into the matter; as apart from the fact that the vibration to which it is subject would overcome any such tendency, the magnitude of the alteration in the height of the column of liquid accompanying changes in velocity at ordinary flying speeds, is altogether too great compared with any lag that there may be. Thus, if the instrument is so graduated that a column of 8 inches represents a speed of 100 miles per hour, at 50 miles per hour the difference in the height of liquid in the two limbs would be 2 inches and at 60 miles per hour it would be 2·88 inches.

The arguments adduced by Mr. Booth in support of his contentions appear to leave little room for doubt as to the accuracy of his conclusions, which may be equally well applied to any form of indicator that is gravity controlled. In view, therefore, of the supreme importance of knowing the actual speed of the machine relative to the air, under many flying conditions, owing to the fatal consequences that may ensue should reliance be placed upon an

instrument that is defective in this respect, we shall be glad to receive the opinions or the experiences of aviators and others on this matter.

Smuggling by Aeroplane. According to the *Evening Standard*, a Bill is to be introduced into Parliament during the coming session to deal comprehensively with the questions of smuggling by aeroplane, and of free aerial navigation in these islands.

There are many reflections that may be inspired by this announcement, assuming it to have a solid basis of fact for its foundation. First and foremost, it brings home very forcibly to the mind the enormous progress in flight that is implied by such action by a responsible government. When we remember that it is only about five years ago since the first flights were made by man, and that now the science has made such strides as to have made the Governments of the world anxious about their customs frontiers, it seems almost too much to be believed by men in their sober senses. And yet the evidences are all there in the shape of cross-country flights of many hundreds of miles, flights that have brought home to every intelligent observer the conviction that frontiers have ceased to exist, except as merely geographical expressions.

Next there comes the impression that, as we have so often observed in these columns, flight has become so absolutely a commonplace that no one dreams of even attempting to controvert any proposition, however wild it might have appeared a year or two ago. It is simply accepted just as the record of a train journey would be. Let us quote from the *Evening Standard's* article. It says:

"It is no secret that the Excise authorities have been perturbed for months past over the impossibility under existing conditions of framing any Customs regulations which would effectually control the movements of aircraft. Officially Great Britain is surrounded with a non-existent fence open to aircraft through certain small and equally non-existent gates on difficult portions of the coast. Practically there is nothing whatever to prevent any aviator from crossing the Channel and bringing back a quantity of dutiable material, which he could drop, if necessary, by means of a parachute or without it, in some prearranged spot."

There is a simple statement of the facts, without any argument for or against the proposition that it is possible to conduct a smuggling service by way of the air—simply an acceptance of the fact and nothing more. To us it seems all very wonderful and very eloquent of the progress that has been made in the past four years. If the suggestion goes any further, we may express the hope that any legislative action that may be taken will stop short of anything that may be calculated to retard the proper development of the movement. It is absolutely essential that development should be as free as possible, and that

it should not be hampered by unduly repressive legislation, although it is quite conceivable that it may be deemed necessary presently for something of the sort to limit the enterprise of those who may be tempted to enter upon illegal enterprises. As to how this is to be done is another matter. The *Evening Standard* suggests that it may be possible to establish a service of aerial police. That, we think, is going rather beyond the possibilities of the present, whatever may be the case in the future. In this connection we are content to leave things to the authorities themselves, always with the proviso that nothing be done to hamper the proper development of flight as a science.

The Hendon Aerodrome and its Work.

At the beginning of another year we feel we should be doing something rather less than justice to the Hendon Aerodrome did we not make some reference to the work it has done in the cause of advancement during 1913. Its meetings have become one of the most popular spectacles in London, and therein it has been enabled to accomplish much good work for the movement at large. As we have so often pointed out in these columns, it depends altogether on the man in the street whether or not the authorities rise to the needs of the situation in so far as concerns our position in matters affecting aerial defence. Without some such institution as the Hendon Aerodrome, it would be impossible to bring home to that individual exactly what the potentialities of flight are and are likely to be. Through its medium many hundreds of thousands of the populace have been given, during the year, an excellent opportunity of seeing at first hand to what perfection the science of dynamic flight has attained, and, collaterally, what a tremendous bearing it must have on the defence problems of the future. Its educative value, therefore, has been enormous—so great, in fact, that we may justifiably apply the term of a truly national institution to it. To our way of thinking, it is only a pity that there are not many more such enterprises in full work in other parts of the country. If there were, we feel assured that we should not have to regard the future with the misgiving which all thoughtful people must feel when they contrast our own present position in the air with that of our possible rivals. In saying this we do not wish for a moment to belittle the splendid work that has been done by both Services. But much as they have accomplished during the year, there still remains much to be done, in which institutions like Hendon can bear a great part. It is only to be hoped that the Government will properly back up the efforts which are being put forward by those who have taken up the great cause of aviation.

PIERRECHANTELOUP.

THERE is no lack of romance connected with the career of Chanteloup, the young French pilot, who has become famous on account of his marvellous exploits on the Caudron biplane—looping the loop, tail diving, &c. He was born at Beaune twenty-four years ago, and his first occupation was that of farm labourer, but his bent was towards mechanics, and in 1909 he passed his tests for driving a taxicab, at which occupation he remained for two years at Nantes. He then, having saved up the necessary tuition fees, underwent a course at the Caudron School, at Crotoy, and obtained his ticket in July, 1911. Later in the same year he commenced his military

service as sapper-aviator. On September 6th last he purposely looped the loop, or flew upside-down on a Caudron biplane, and for his pains received 15 days' imprisonment, by order of the military authorities, for dangerous flying. As soon as his period of military service had expired, he returned to the Caudron firm, and since then he has been giving his daring demonstrations under their auspices in various countries. Personally, he is the most unassuming and genial pilot one could wish to meet. He enters his machine smiling, he is smiling when he leaves it, and I firmly believe he is still smiling when he is flying upside-down. THE HAWK.

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FLIGHT

MEN OF MOMENT IN THE WORLD OF FLIGHT.



M. CHANTELOUP.

A WARNING TO PILOTS.

By HARRIS BOOTH, A.M.Inst.C.E. A.F.Ae.S.

THOUGH it is now pretty generally admitted that the use of a speed indicator is a good safeguard—almost an absolute safeguard—against accidents due to stalling a machine, it is curiously noticeable that those pilots whose experience has been limited to the pitot tube type are of the reverse opinion.

Until quite recently I, rather foolishly, supposed that this was mainly due to prejudice on the part of pilots trained in the old school to rely on the feel of the machine, though I thought it might be partly due to the fact that this type usually depends on a liquid gauge, which is obviously rather liable to get out of order.

The other day, however, I discovered the true reason for the discredit from which this type suffers: it is that the liquid gauge part of the apparatus is *gravity controlled*; that is to say, the liquid column is urged up by the pitot pressure and held back by its weight, so that it moves just so much as to keep the balance between these two opposing forces. This arrangement seems, at first sight, to be so simple that it cannot very well go wrong, but, as a matter of fact, it can and does go wrong, and that just when it is most needed.

As I have said, in this kind of instrument everything depends on two things, namely, the action of the pitot tube and the weight of the liquid. Now, as a matter of fact, the pitot tube is infallible: it sends a pressure down the pipe which is proportional to the square of the relative speed under all possible conditions in actual flying practice, but the *weight* of the liquid in the gauge-glass actually *varies* whenever the machine meets with any conditions that cause it to rise or fall.

The reason for this is that if, for instance, the machine meets a head gust, the relative velocity of the air being temporarily increased, the machine has too much lift on it, and therefore rises with a slight acceleration. The effect of this on the pilot is well known; it forces him harder into his seat, *i.e.*, his weight is, practically speaking, increased for the time being. What applies to the pilot, applies equally to the liquid in the gauge; its weight is increased, and it is thus prevented from moving to the position which properly corresponds to the higher velocity, and, indeed, the liquid actually stays still in the glass, as will be evident from a numerical case.

First of all, suppose as an extreme case (though one not likely to occur in practice) that the machine meets a head gust of its own velocity; this doubles the relative wind speed, so that the lift is four times the normal. This, of course, causes the machine to move upwards with an acceleration equal to three times the acceleration of gravity, all bodies in the machine consequently appearing to be four times as heavy as usual (as we learn from elementary dynamics), so that the liquid in the gauge-glass, in particular, has its weight* temporarily increased to four times the normal. Turning now to the pitot tube, as the relative wind speed is doubled, the pitot pressure is multiplied by four. Thus both the forces on the liquid are multiplied by four; the liquid is, therefore,

* Its mass, however, is, of course, still the same.

still in balance and does not have to move in the glass to get a new position of equilibrium.

That is, to say, a head gust of velocity equal to the machine's normal flying speed has *no effect* on an instrument of this type.

We will take one more case, and this time one which commonly occurs in flying. Suppose that the machine is struck by a following gust of 10 per cent. of the normal flying speed. The relative speed is reduced by 10 per cent., the lift is reduced by 20 per cent., the weight of the liquid is reduced by 20 per cent., and the pressure in the pitot tube is likewise reduced by 20 per cent. Result, again *no movement* of the gauge at all.

Other cases can be easily worked out in a similar way, and it will always be found that although the instrument gives the real speed when flying steadily, *as soon as anything happens*, the instrument gives *quite the wrong reading*.

The above does not pretend to be a full scientific exposition of the cause of failure of these instruments, and indeed the full proof is rather cumbersome, and would probably only carry conviction to the minority. I, therefore, give a couple of easy (and safe) practical tests by which any pilot who has the gravity type of instrument on his machine can satisfy himself of its uselessness, and I strongly recommend all pilots who have these speed-indicators to make these trials, since an ounce of test is worth a pound of theoretical argument.

First Test.—Take the machine up on a fairly calm day, and then move the elevator control backwards and forwards (say, once in a second or two). You will then notice that the speed-indicator moves considerably when this is done. But if you have a speed-indicator worked by springs or their equivalent, you will see that it does not budge for such rapid control movements.

Now ask yourself whether your machine really changed its velocity on the instant with the movement of the control (as the gravity instrument asks you to believe), or whether it had not time to get going at a new speed before the reversal of the control checked it again (as the spring instrument says).

Second Test.—Take the machine out in as gusty a wind as you care to fly in, and take notice of the readings of the gravity indicator at rest, while running on the ground, and when aloft. You will see that the gusts are registered all right while the machine is resting on the ground or running supported by the ground, but once it is air-borne, the gust readings cease and, in fact, the gauge remains at rest excepting when it is disturbed by your elevator movements. Now, if you have a spring-controlled type of instrument, you will see that it gives you the gusts in the air just as much as on the ground.

These tests should convince you that there is something wrong with the gravity-controlled type, and that you ought not to rely on this kind of instrument.

In conclusion, I have only to express my willingness to explain as far as I am able any doubtful points which may crop up on this subject.



Lord Kitchener Tries an Aeroplane.

ON the 29th ult., Lord Kitchener enjoyed a flight with Olivier on an 80 h.p. Farman biplane, and on his return to *terra firma* said he thought it was "a splendid game." During a 15-minute trip, starting from the Heliopolis flying ground, the machine was piloted over the outskirts of Cairo.

Olivier Flies Round the Pyramids.

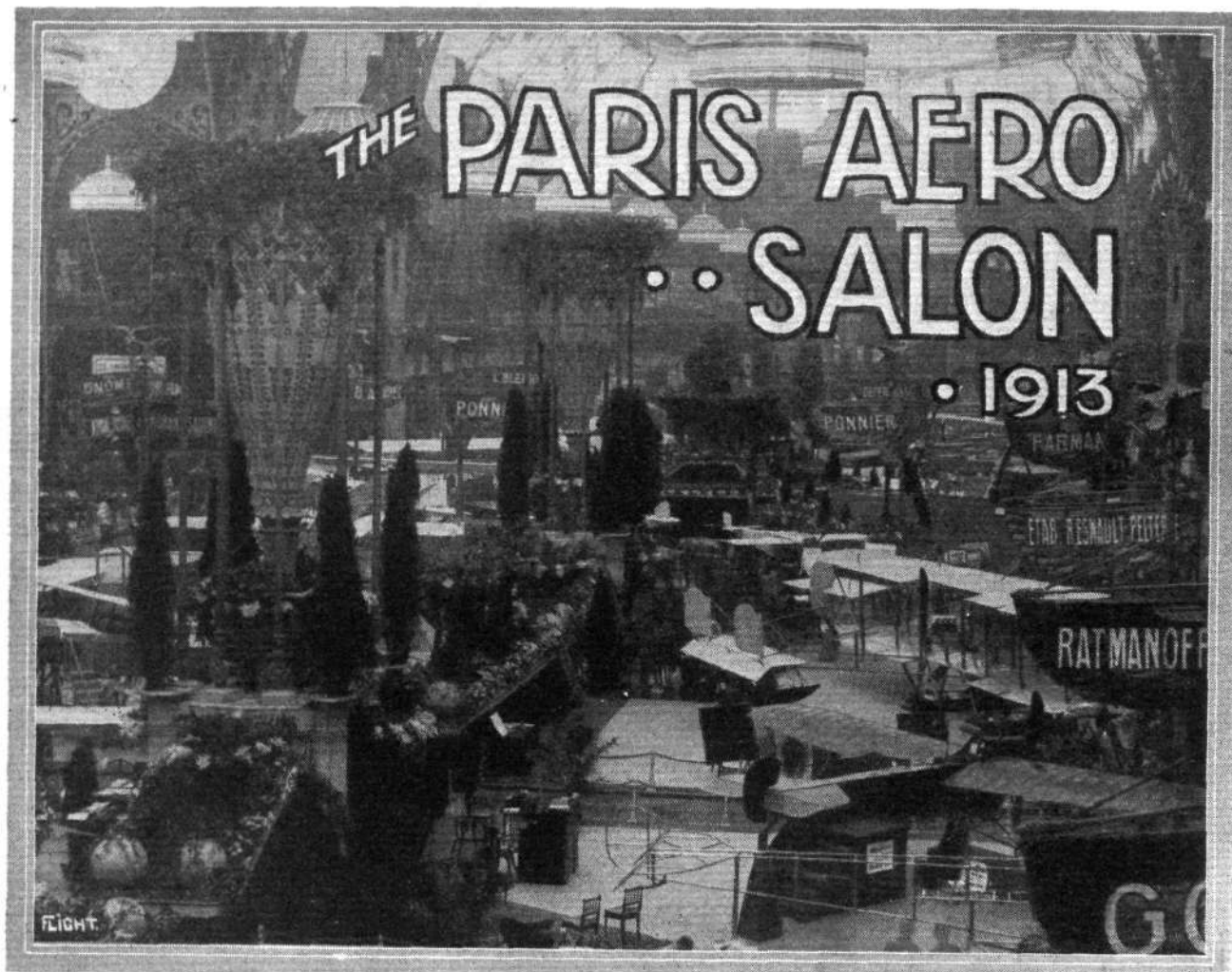
SOME time ago the Boghos Nubar prize of £400 was offered for the first aviator who should fly from Heliopolis round the Ghizeh and Zakkareh Pyramids and back to Heliopolis. This flight was carried out by Olivier on his Farman biplane the other day, and it is announced that he has been awarded the prize.

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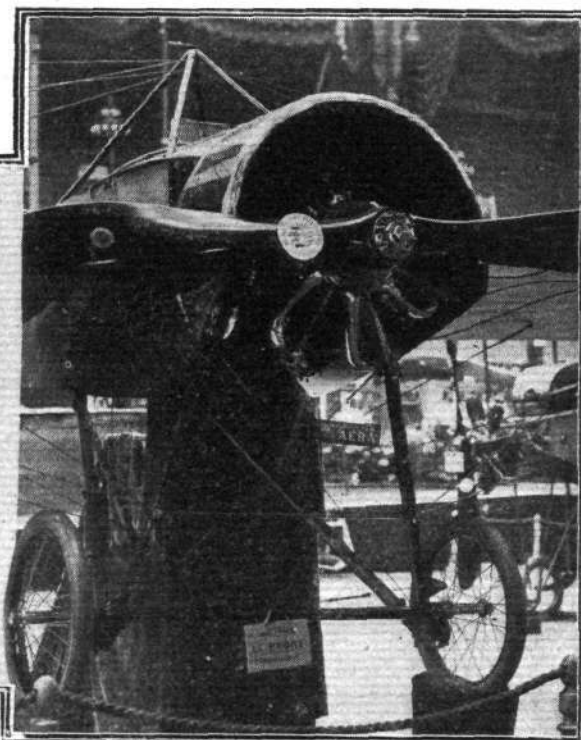
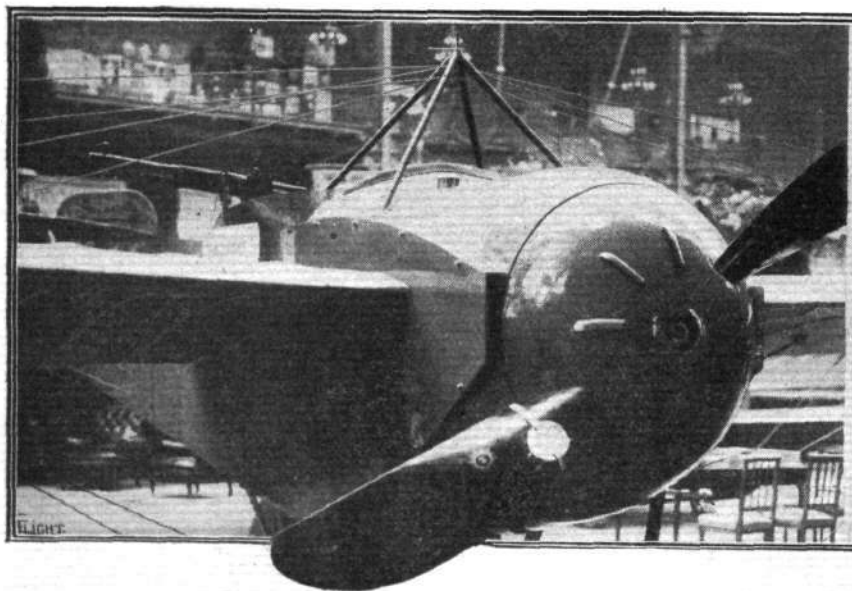
A Maurice Farman hydro-biplane piloted by Mr. Maurice Farman personally, making "rings" round the Beulogne-Folkestone boat, off the French coast. Flight" Copyright.



FOURTH ARTICLE. NIEUPORT.

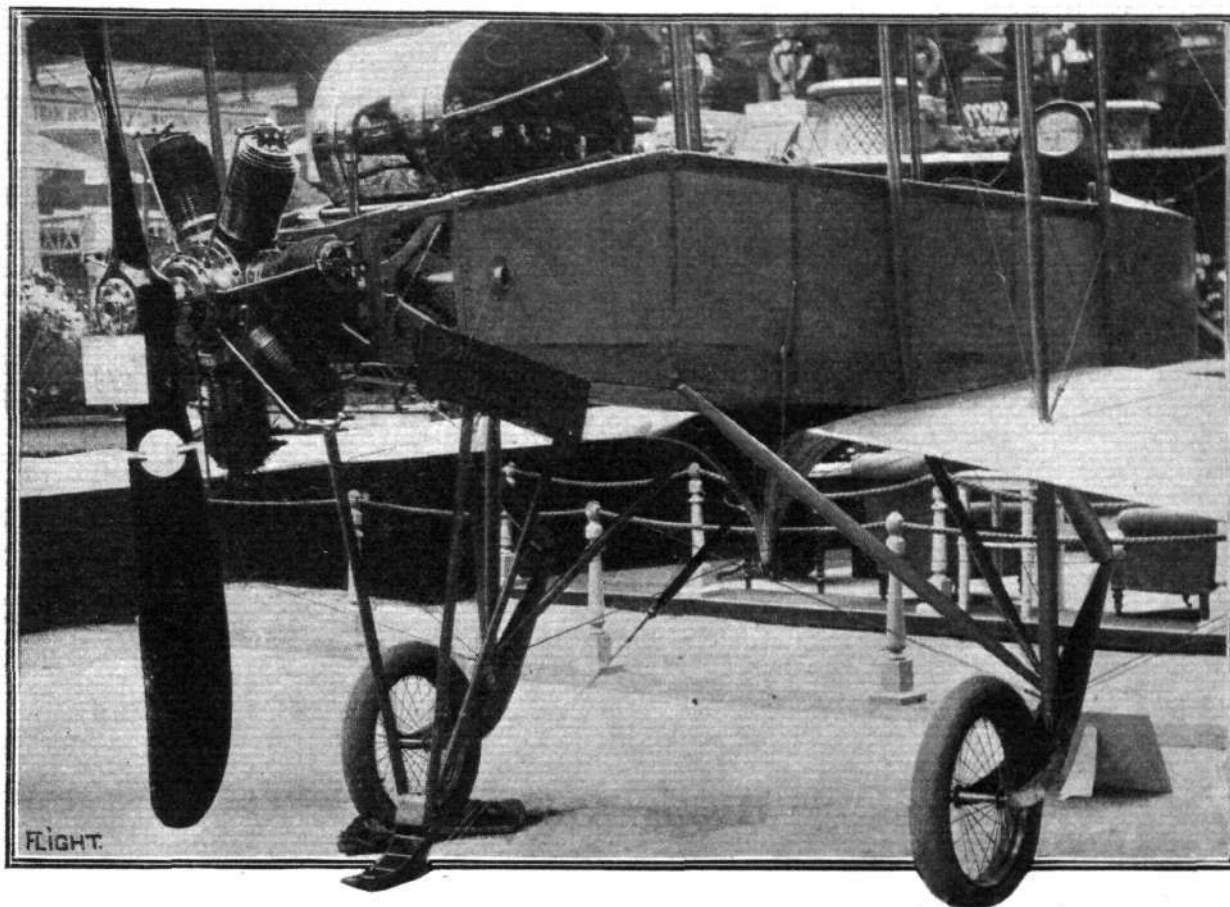
THE Nieuport firm made an impressive show with four monoplanes and a Nieuport-built Dunne biplane. One of the machines, and not the least interesting, was the one on which Helen recently covered a distance of some 20,000 kilometres. The machine, although naturally somewhat dirty, did not seem any the worse for its constant exposure to all sorts of weather conditions, and furnished an excellent proof of the quality of the Nieuport workmanship.

Of the other machines shown, one was an armoured monoplane of the Military type, and fitted with a Hotchkiss machine gun.



THE NOSE OF THE ARMoured NIEUPORT MONOPLANE.—On the right the Nieuport single-seater.

"Flight" Copyright.



Chassis and nacelle of the Nieuport-built Dunne biplane.

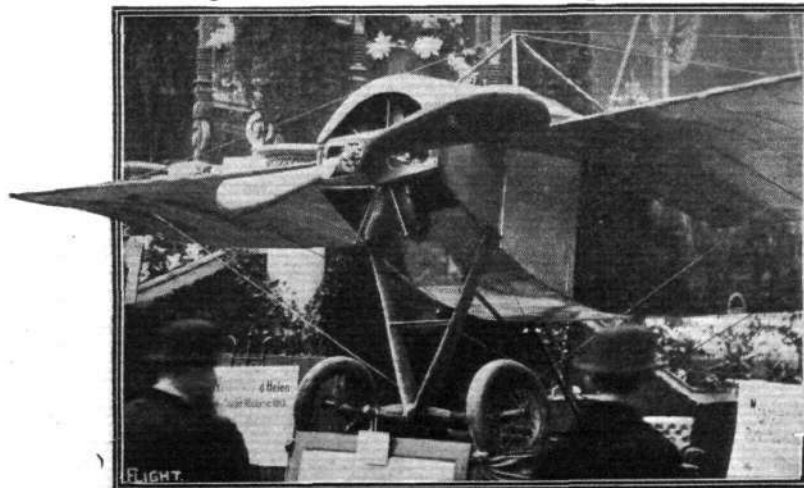
"Flight" Copyright.

The front portion of the *fuselage*, up to just behind the seats, is covered with sheet steel, and a cowl of the same material is fitted on the propeller boss with which it revolves, so that there is very little chance of a bullet hitting any part of the engine, and thereby putting the machine out of action.

It is driven by a 14-cyl. 160 h.p. Gnome engine, mounted on double bearings. The *fuselage*, which is of the usual deep Nieuport section, is built up of four *longerons* of ash, connected by struts and cross-members of spruce.

Inside this roomy *fuselage* are arranged the seats for the pilot and two passengers, the pilot's seat resting on a large petrol tank in front and the passengers' seats arranged side by side behind him. The set of instruments fitted is one of the most complete seen on any of the machines at the Show. The chassis is of the usual Nieuport type, consisting of three pairs of V-struts of streamline steel tubes, which carry on their lower extremities a tubular skid, whilst springing is effected by means of a leaf spring-axle carrying

the two wheels. A rocking shaft sloping down from the *fuselage* to a bearing behind the rear pair of chassis struts carries a crank-lever, to which are attached the warping cables. On the upper end of this rocking shaft is mounted a transverse foot-bar, by means of which the wings are warped. A single tubular lever is used for operating rudder and elevator. The main planes are of the usual

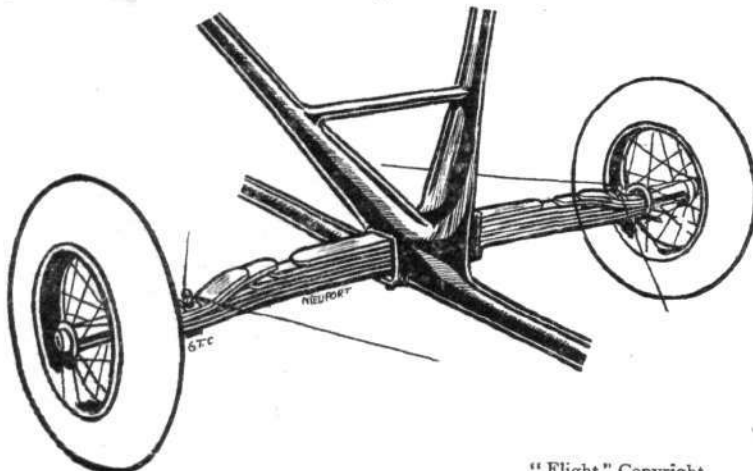


HELEN'S NIEUPORT MONOPLANE WHICH HAS COVERED A DISTANCE OF ABOUT 20,000 KILOMS.—
On the right the tandem-seater military Nieuport.

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Nieuport section, and taper considerably towards the tip. The fixed tail plane, which is of semi-circular shape, is mounted on top of the fuselage and to its trailing edge are hinged the two elevator flaps. The rudder, which projects some distance above the tail plane, is pivoted to a steel tube forming the stern post of the fuselage.

Of the other machines shown, one is a tandem two-seater Military monoplane, which is driven by an 80 h.p. 7-cyl. Clerget engine, mounted on double bearings in the front portion of the fuselage. This machine follows in every respect the usual Nieuport practice. The seats for the pilot and passenger are arranged tandem fashion, the passenger's seat in front being mounted on one side of the fuselage, so that he is facing towards the right-hand wing. The object of this arrangement is not quite clear, but the idea is presumably to give the pilot a more unobstructed view straight ahead. The two seats are



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The leaf spring of the Nieuport tandem two-seater.

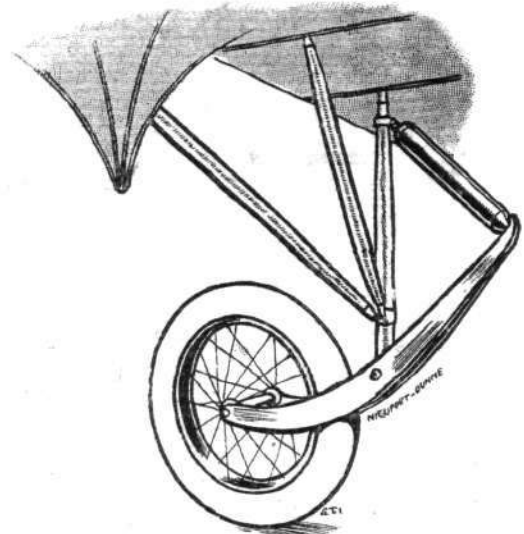
arranged, each in its own cockpit, each occupant being protected by a wind-screen of large dimensions.

The remaining monoplane is slightly different from the usual Nieuport machines, and is somewhat reminiscent of the Morane-Saulnier monoplane, this resemblance more especially applying to the chassis and engine housing. It is fitted with a 7-cyl. 60 h.p. Le Rhone engine, mounted on overhung bearings.

The cockpit in which is situated the pilot's seat seems very comfortable, and similarly to the other Nieuport machines, no trouble or

expense seems to have been spared in order to make the instrument board as complete as possible. The controls in this machine differ from the usual Nieuport practice in that the hand-lever is used for warping and a foot-bar for operating the rudder.

The Nieuport-built Dunne biplane completes this exhibit, but as the Dunne machine has been fully described quite recently in the columns of FLIGHT, there is no need to describe it here in detail. Several minor alterations have been made in the construction; for



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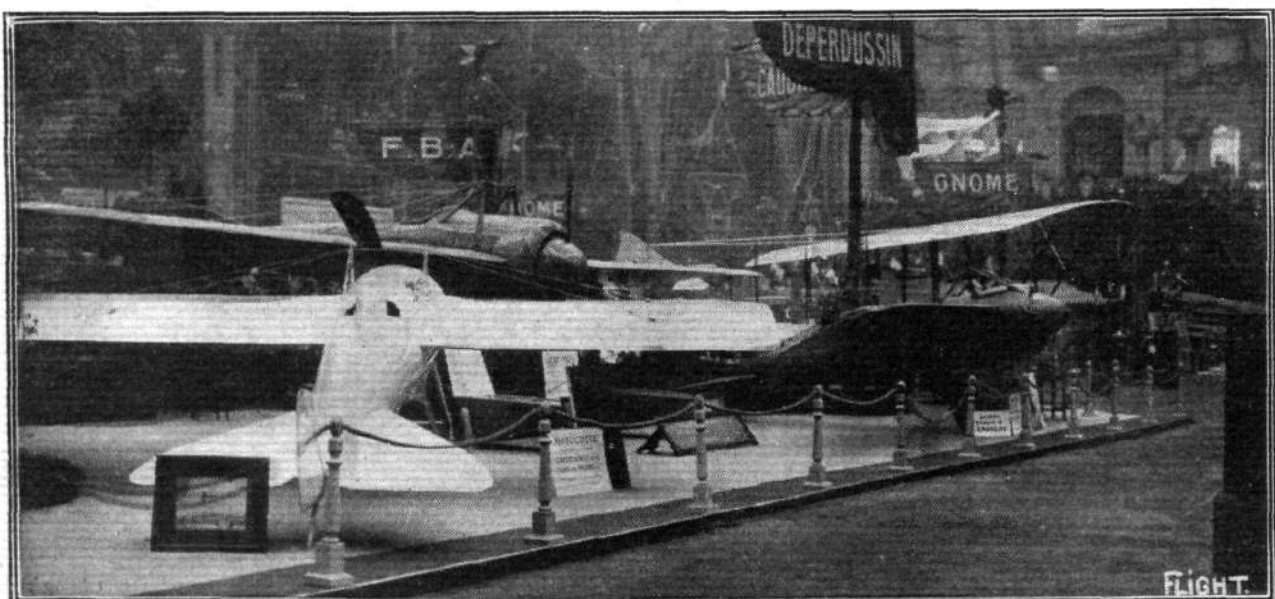
Sketch illustrating the method of springing employed on the Nieuport-built Dunne biplane.

instance, the nacelle is built up of steel tubes, and is of a slightly different form from that of the British-built machine. Also the chassis has been altered, and is in this machine surprisingly like the chassis fitted on the Blériot biplane. Another alteration is that all the inter-plane struts are made of streamlined steel tubes, whereas in the British machine, it will be remembered, they were made of spruce. The workmanship of this machine, as well as that of all the monoplanes, is of very high quality, as one might expect from a firm of Nieuport's standing.

DEPERDUSSIN.

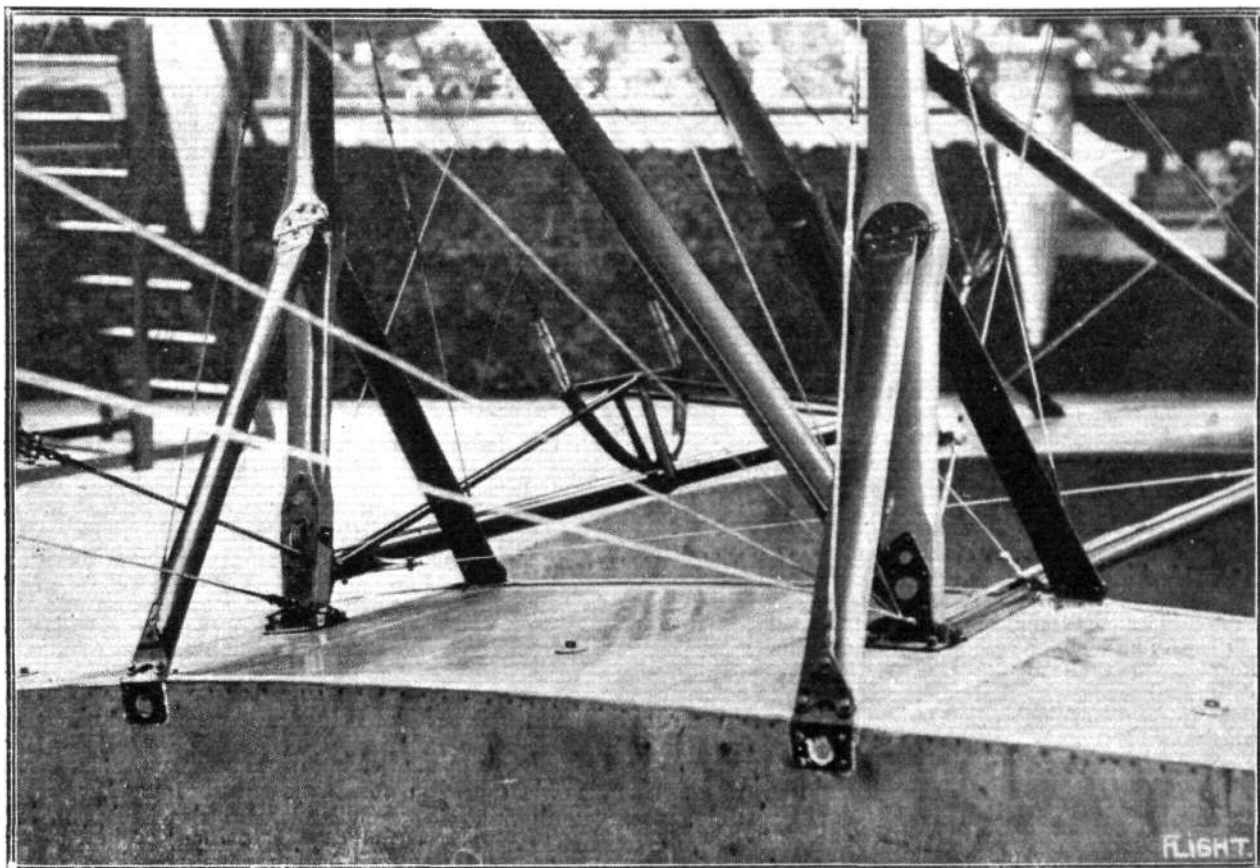
All three of the machines exhibited on the Dep. stand had fuselages of the monocoque type, so that apparently this construction has been found satisfactory, and it certainly offers several advantages. In the first place a much better streamline may be obtained by this construction, as there are no sharp corners to cause edge disturbances. Secondly, for military purposes it would seem that this

construction is less liable to get seriously damaged by bullets piercing it than would a fuselage of the ordinary girder type, for is is quite conceivable that a monocoque fuselage might be penetrated by a lot of bullets without its strength being very greatly affected, whereas a bullet hitting one of the longerons of a girder type fuselage would weaken that structure tremendously.



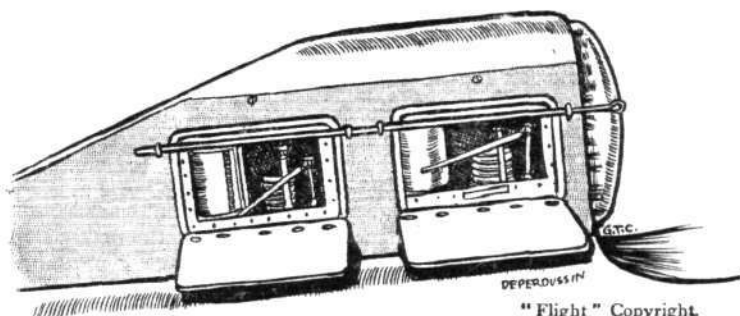
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THE DEPERDUSSIN STAND.—On the left is seen the Gordon-Bennett racer, and in centre the Dep. hydro.



Details of the Dep. float attachment.

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A neat way of mounting the instruments on the Deperdussin monoplane.

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(To be continued.)

Legagneux Beats the Height Record.

AFTER making an unsuccessful attempt to improve on the world's height record at Villacoublay, on the 19th ult., when he only got up to 5,700 metres, Legagneux had his Nieuport monoplane despatched to St. Raphael in the Riviera. There his efforts were rewarded, and on Saturday, during a flight which lasted 1 hr. 49 mins. the barograph showed that he attained an altitude of 6,150 metres (20,200 ft.). The old record was 5,880 metres (19,600 ft.), made by the late E. Perreyon on a Blériot, at Buc, on March 11th, 1913. Legagneux started from the Frejus aerodrome. To assist his breathing he inhaled oxygen when ascending above 4,000 ft., and when he landed his barograph was covered with ice. The machine was a light Nieuport, fitted with an 80 h.p. Rhone motor and Chauvière propeller, and the planes were doped with Novavia. It is interesting to recall the progress of the height record. At the end of 1908 it stood to the credit of Wilbur Wright, with 100 metres; in 1909 to Latham, 453 metres; in 1910 to Legagneux, with 3,100 metres; in 1911 to Garros, with 3,950 metres, and in 1912 also to Garros, with 5,601 metres.

Other Aspirants for Height Honours.

THREE other pilots besides Legagneux are also in the South of France with the object of attacking the height record, Garros and Gilbert being at Frejus with Morane monoplanes, while Bielovucic is at Nice with a Ponnier.

One of the machines shown was the actual monoplane on which Prevost won the Gordon-Bennett Race, and which was described fully in FLIGHT only a short time ago. The other land machine is the one flown by Gilbert in his famous flight from Paris to Putnitz on the Baltic Sea, a distance of 1,050 kiloms., which he covered in 5 hrs. 11 mins., or at an average speed of over 200 kiloms. an hour. The tanks necessitated by so long a flight were mounted on the outside of the fuselage in such a manner that they did not disturb the symmetry of the machine, but on the contrary were utilised to form the excellent streamline. Except for the fact that this machine has more serviceable wings braced in a more secure manner, it was practically the same as the Gordon-Bennett racer.

The third machine shown was a hydro-monoplane which does not seem to differ materially from previous Dep. hydros. It was a two-seater monoplane, with the pilot's and passenger's seats arranged tandem fashion.

Through American Eyes.

THE looping-the-loop feats of Lincoln Beachey on a 90-100 h.p. Curtiss machine has roused the vivid imagination of one American reporter. He says: "There is as much difference between the loop-the-loop flying of Beachey and that of the Frenchman, Pegoud, as between the trans-Atlantic performance of one Cristoforo Colombo and that of a modern liner. To give Pegoud his due—he did it first. But he flew upside down and looped-the-loop with passenger-carrying wings of large surface and an engine of small power. His machine probably carried not more than 3½ lbs. to the square foot, and flew at a speed of less than 45 miles an hour. Beachey, on the other hand, is looping the loop in a small surfaced speed machine. It is carrying about 6 lbs. to the sq. ft. of lifting surface, has one of the 90-100 h.p. Curtiss motors, and flies at approximately 75 miles an hour. One machine flutters over like a dead leaf turning in still air; the other shrieks in an aerial circle like a crazy sky-rocket."

A Record Balloon Trip.

ON Saturday, December 13th, the German balloon "Duisburg" ascended from Bitterfeld with three passengers, Von Kaulen, Schmitz and Krest. After being in the air for 87 hours, it landed at Perm, in East Russia, close to the Ural Mountains, so that a distance of 2,800 kilometres (about 1,740 miles) had been covered, thus beating the world's record of 2,400 kiloms. of M. Bienaime.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Aviators' Certificates. NEW REGULATIONS.

SPECIAL attention is drawn to the new regulations for Aviators' Certificates which came into force on January 1st, 1914. In the altitude flight a maximum reading aneroid must be carried on the aeroplane.

The revised rules are as follows:—

AVIATORS' CERTIFICATES. (Fédération Aéronautique Internationale.)

The Sporting Authority governing aviation in each country represented on the F.A.I. can alone grant Aviators' Certificates to all candidates, of at least 18 years of age, and coming under its jurisdiction.

1. To candidates of the same nationality as the Club.
2. To foreigners belonging to a country not represented on the F.A.I.

3. To foreigners of a country represented on the F.A.I.; but in this case the certificate can only be delivered with the authorisation of the Sporting Authority of the candidate's country.

The Royal Aero Club of the United Kingdom will grant certificates in accordance with the regulations of the Fédération Aéronautique Internationale to candidates who have complied with the following rules:—

RULES.

1. Candidates must accomplish the three following tests, each being a separate flight:—

A and B. Two distance flights, consisting of at least 5 kilometres (3 miles 185 yards) each in a closed circuit, without touching the ground or water; the distance to be measured as described below.

C. One altitude flight, during which a height of at least 100 metres (328 feet) above the point of departure must be attained; the descent to be made from that height with the motor cut off. The landing must be made in view of the observers, without restarting the motor.

2. The candidate must be alone in the aircraft during the three tests.

3. Starting from and alighting on the water is only permitted in one of the tests A and B.

4. The course on which the aviator accomplishes tests A and B must be marked out by two posts or buoys situated not more than 500 metres (547 yards) apart.

5. The turns round the posts or buoys must be made alternately to the right and to the left so that the flight will consist of an uninterrupted series of figures of 8.

6. The distance flown shall be reckoned as if in a straight line between the two posts or buoys.

7. The alighting after the two distance flights in tests A and B shall be made:—

(a) By stopping the motor at or before the moment of touching the ground or water;

(b) By bringing the aircraft to rest not more than 50 metres (164 feet) from a point indicated previously by the candidate.

8. All alightings must be made in a normal manner, and the observers must report any irregularities.

9. Each of the flights must be vouched for in writing by observers appointed by the Royal Aero Club. All tests must be under the control of, and in places agreed to by, the Royal Aero Club.

10. The Royal Aero Club declines all responsibility for any accidents, or any damage that may occur to the aviators, their aircraft, or to any third parties during or in connection with the qualifying tests of the candidate.

11. Candidates must make application on a form provided for that purpose, and this form must be sent to the Royal Aero Club prior to the tests being made. Any expenses incurred must be borne by the candidates.

12. Foreigners belonging to a country represented on the Fédération Aéronautique Internationale can only receive a certificate from the Royal Aero Club with the consent of their

national Sporting Authority. A certificate may be granted to a foreigner whose country is not represented on the Fédération Aéronautique Internationale.

13. The Committee of the Royal Aero Club will decide if the candidate has qualified for a certificate, but reserves the right to refuse the same or withdraw the same at any time without giving reasons.

14. The decision of the Committee of the Royal Aero Club in all matters connected with the tests is final and without appeal.

The Jacques Schneider Maritime Aviation Cup and Prize, 25,000 frs.

Mr. Jacques Schneider has given a trophy of the value of 25,000 francs and a cash prize of 25,000 francs for three years for international maritime aviation competition.

The Aero-Club de France, having won the prize last year, has organisation of the race for 1914. The Prize will be competed for over a distance of 150 nautical miles. The Contest will take place exclusively at sea, outside any port, and over a course of not less than 5 nautical miles. Further details will be announced later.

Each club affiliated to the Fédération Aéronautique Internationale has the right to challenge the holder, the Aero-Club de France, and such challenge must be sent in before March 1st, 1914.

The Committee of the Royal Aero Club will select three competitors to represent the British Empire, and intending candidates are requested to notify the Secretary on or before Tuesday, February 24th, 1914, of their willingness to compete, if chosen. Applications must be accompanied by a cheque for £20, the entry fee, which amount will be returned should the entrant not be selected.

Gordon-Bennett Aviation Cup.

RULES FOR 1914.

The Race for the Gordon-Bennett Aviation Cup will take place in France this year.

The Race will be over a distance of 200 kilometres on a course having a minimum distance of 5 kilometres.

Competing aircraft, before taking part in the Race, will have to pass the following preliminary test:—

A flight in a straight line out and back of about 2 kilometres, without touching the ground, at a constant height of not more than 30 metres. The speed of the test shall be the mean of the speeds of the flights out and back, which must not exceed 70 kilometres per hour. In this test the aircraft must carry sufficient petrol and oil to cover the whole course of 200 kilometres. Three attempts will be allowed to each competitor.

After the qualifying tests have been passed, no modifications may be made to the aircraft. Repairs will only be allowed with the permission and under the control of the Officials.

Each club affiliated to the Fédération Aéronautique Internationale has the right to challenge the holder, the Aero-Club de France, and such challenge must be sent in before March 1st, 1914.

The Committee of the Royal Aero Club will select the three competitors to represent the British Empire, and intending candidates are requested to notify the Secretary on or before Tuesday, February 24th, 1914, of their willingness to compete if chosen. Applications must be accompanied by a cheque for £20, the entry fee, which amount will be returned should the entrant not be selected.

Gordon-Bennett Balloon Race.

The cup having been won by a representative of the Aero Club of America, the race for 1914 will take place in America. The exact time and place will be announced later.

Each club affiliated to the Fédération Aéronautique Internationale has the right to challenge the holder, the Aero Club of America, and such challenge must be sent in before February 1st, 1914.

The Committee of the Royal Aero Club will select the three competitors to represent the British Empire, and intending candidates are requested to notify the Secretary on or before Tuesday, January 13th, 1914, of their willingness to compete, if chosen. Applications must be accompanied by a cheque for £20, the entry fee, which amount will be returned should the entrant not be selected.

166, Piccadilly, W. HAROLD E. PERRIN, Secretary.

A Voyage in Space.

EACH year round about Christmas time the theatre at the Royal Institution is invaded by crowds of children, and then the grave seriousness which usually dominates its atmosphere is crowded out. For this year's Christmas lectures, the Savilian Professor of Astronomy

at Oxford, Dr. H. H. Turner, chose as his subject, "A Voyage Through Space." The first lecture on Saturday was mainly devoted to astronomy, &c., but in the second, on Tuesday last, Dr. Turner led his audience by very simple ways to understand something of how and why an aeroplane flies, and the use of balloons, kites, &c.

EDDIES.

I HAD a letter from Harry Busteed recently, enclosed with the photograph of himself which figured in our "Man of Moment" series, which perhaps puts the case for the inclusion of this page in FLIGHT in a nut-shell. He has been away for some time down at Pembroke Dock testing hydro-aeroplanes, and complains that because he is far away, everybody seems to have forgotten him. That's just the rub! If pilots go away and won't write to us to let us know what is happening in their part of the world, how on earth are we to know? I, like most people, derive great pleasure in receiving letters, and I should like all to write to me and let me have all the news, and I promise to write back, and so we may in the new year keep in touch with one another to our mutual pleasure and, I hope, benefit. By the way, I see that he has just been gazetted a Sub-Lieutenant in the reserve of the "King's Navee," so the Government have added another good pilot to their list.

Except to his personal friends, it is perhaps not generally known that Mr. B. C. Hucks is a past-master in the art of repartee. To be a silent witness to a battle of wits between him and another is indeed a treat. Perhaps a couple of instances will not be amiss here.

Some little time ago when flying at Birmingham, where, on alighting, the people flocked round the machine and could not be kept back, he was much pestered by one of the "nutty" type, who had evidently read it all up and wanted to air his knowledge before his lady companion, when the following took place:—

"Ah! This is a Blériot, is it not?"

"Yes; this is a Blériot."

"Ah! It's a Gnome engine, is it not?"

"Yes; it's a Gnome engine."

"Ah! The whole thing revolves, does it not?"

"Well, not exactly. In this case it's only the engine."

"Oh!—er—yes, of course, I meant that. The petrol is led into the engine by a hollow tube, is it not?"

"Yes, in this case it is; but some use a solid one, I believe!"

At the same meeting Mr. Hucks remarked to some friends that it was very windy, and that he had got rather badly bumped once or twice.



He was overheard by a little man who stood about four feet nothing in his shoes.

"Wind? I thought aviators flew in any wind now; why, there's no wind to-day!"

Hucks, who is fairly tall, looked down at his little heckler, with a world of pity in his eyes.

"Well, there might not be any wind down where you are, sonny, but there is up here!"

The recent action brought by the Pashley Brothers, to recover damages arising from a collision of aeroplanes, was memorable, not only because it was the first case of the kind brought in the High Courts in England, but also because, strange to say, both the plaintiff and the defendant limped into court with crutches and sticks,

though through no effects of the accident. One had been injured by a motor cycle and the other received his hurt at football. It is notorious that all airmen consider themselves much more safe in the air than when following sport of any kind on the ground. Mr. Grahame-White once remarked that he never felt safe in a taxi, and much preferred to be aloft; and I was once at Brooklands during the progress of a motor cycle race, when Gordon Bell, who was once a motor cycle racer, was asked how he would like to go back to it again: "Not me," he said, "it's too dangerous."

Once again is the danger arising from the fascination of speed brought home to us by the sad death of poor Bobbie Slack. There is very little room to doubt that men accustomed to flying get saturated with the lust for speed, and hardly realise they are indulging in it when on the road. I have ridden with several airmen in their cars, and one and all have driven much too fast for safety on the public roads. I am not at all afraid of speed in its proper place, and have ridden round the track at Brooklands quite as fast as is necessary to cure a sluggish liver, but on the road, one is safe only till something happens. A friend of mine has recently been doing a good deal of motoring in a very hilly district as a passenger in a car driven at speed. On the last day the back axle broke just as they got home. Had it broken half-an-hour previously when they were descending almost a precipice, a most serious accident could not have been avoided.

It is a pity that such a splendid aerodrome as that at Shoreham should have so little attraction for the people of Brighton. Brighton is a most peculiar place, and its people look down on Shoreham and Portslade as poor relations, and will have none of them. I certainly thought that such an event as the looping the loop by Mr. B. C. Hucks would have drawn a big crowd, but the result could not have been very encouraging, and no doubt it will be some time before they see Hucks there again. Yet when Salmet had to make a descent at Ripton Farm, off the Maidstone road, on his flight to France with the Hon. Mrs. Assheton Harboard as a passenger, a crowd of over a thousand people were quickly on the spot. Yes, Brighton, indeed, is a funny place, and no commercial traveller will go there if he can possibly avoid it. It is one of the jokes of the trade to send a new man to Brighton on his first trip; if that doesn't break his heart, he will turn out a good man.



The difficulty of landing the fast little Morane-Saulnier monoplane has been seen at Hendon recently, where three of them have turned turtle after a good landing and when almost at the finish of their run. It seems rather a pity that this machine is not fitted with some sort of small front skid, not with any idea of saving the machine in a rough landing, but simply to offer some resistance to its standing on its nose just at the end of the run, and so save a few broken propellers. It seems to take very little

to turn this machine off its course on the ground, especially as the speed decreases, and the rudder has little or no effect. The machine slews round and heels over till one wing-tip touches the ground, generally without damage, so far, but instantly the machine cart-wheels and gently stands on her nose, and a front skid or skids would, I think, save the situation.

I really cannot quite believe that story about the mice in the aeroplane, even though it comes from the *Daily Mail*. You know it, of course? An Army biplane, after being flown from Aldershot to Montrose, was being overhauled when a nest of mice, including Mrs. Mouse, was found in a corner of one of the wings. I believe, even in our small way, it costs quite a lot of money to provide for the overhauling and upkeep of the few machines we possess, and surely if a mouse not only made a



hole in the fabric of a wing, but also set up a nest there, it would have been seen—we are not really so bad as all that! Anyway, what a good job it was that Mrs. Mouse was at home when the journey started, because it was only through

her being seen that the nest was found, and the young mice might have eaten up the whole machine, and even swallowed the story.

Visiting Hendon on Saturday with the object of watching Chanteloup perform his aerial evolutions, I was delighted to run across Sidney Pickles, looking remarkably well considering what he has gone through. Unfortunately the plaster splint cannot be removed from his leg just yet, so he still has to content himself with watching the flying instead of taking an active part, but his interest in the art he has chosen to take up is as keen as ever, and he had travelled up from Brighton to see one of his favourite machines put through her paces.

I found him very cheery and brisk, and in the course of a long chat, he told me that he thought it a mistake for pilots to fly any machine that happens along, and that they should stick to one, or at most two, and that he would never have had his accident on the Champel had he known just a little more about it. Machines, he says, apparently seem exactly alike to control, till the moment when you expect a quick or a slow response and then comes the slight difference factor that upsets all calculations. His return to Brighton should help materially towards his complete recovery, and I hope soon to see him back with us in his old rôle.

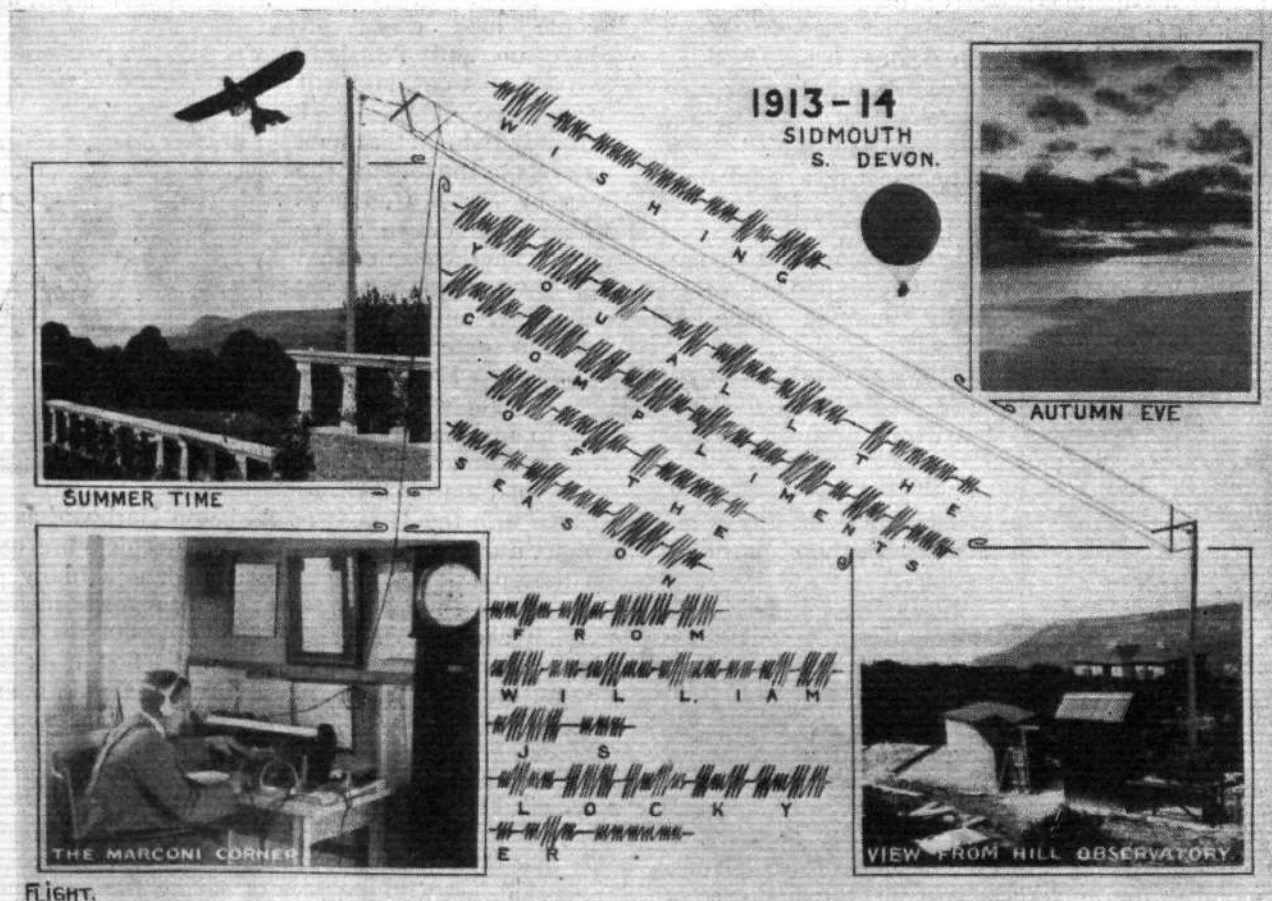
"WILL O' THE WISP."

The "Hansa" to be Overhauled.

AFTER being in use for over seventeen months the Zeppelin liner "Hansa" has taken up her winter quarters at Potsdam, where she is to be given a thorough overhaul. The airship station at Potsdam has been closed to the public for the winter months.

A Zeppelin Museum.

THE municipal authorities of Friedrichshafen have proposed to start a Zeppelin museum on the occasion of the 75th birthday of Count Zeppelin, and Count Zeppelin has promised to do what he can to assist them in getting together an interesting collection.



As usual, Dr. Wm. J. S. Lockyer sends us an unique reminder of the season, this time his greetings taking the above interesting form of a Marconigram. Dr. Lockyer has considerably translated, for the uninitiated, the hieroglyphic message.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

ONLY one flight was made last week, Sub-Lieut. Rainey taking up the Bristol tractor, with 80 h.p. Gnome, in a very high wind on Tuesday. Further flying was stopped by the rain.

Brooklands Aerodrome.

For the week preceding Christmas, at the Bristol School four pupils—Mr. Finney, Lieut. Bridson, Mr. Macdonnell and Mr. Don, R.N., passed their *brevet* tests in good style. With the new year, one of Mr. Merriam's most promising pupils, who took his ticket in brilliant style, Mr. F. B. Halford, will act as instructor under Mr. Merriam.



Lieut. McDonald, who took his *brevet* excellently at the Bristol School, Brooklands.

On the Friday Mr. Gordon Bell left Eastchurch for Brooklands on a 50 h.p. Short biplane, but ran into a fog after Sutton, and it took him half an hour to get thence to Epsom, the fog being so thick that he came down near the Grand Stand and stayed for a couple of hours. For an hour and a half he tried to find Brooklands where the noise of his engine was plainly heard, but in the end he stopped at Epsom for the night. In his endeavours to locate the aerodrome, Mr. Gordon Bell varied his altitude from a height of 4,000 ft. to one of 40 ft., and the absence of a compass from his machine did not improve matters.

Mr. Gordon Bell flew in from Epsom, and left his machine at Brooklands. Mr. Barnwell was flying well on the new Vickers gun-carrying machine, as were Mr. Merriam on the Bristol biplane, Mr. Dukinfield Jones and several other pilots on the Flanders biplane, Mr. Pixton on the Sopwith biplane, and Mr. Raynham on the 80 h.p. Avro biplane.

On Sunday, the 21st December, the weather conditions were perfect for flying, and eight different machines made a number of interesting flights. Mr. Barnwell was early astir on the Vickers gun-carrying biplane. Mr. J. Alcock was flying extremely well on the Maurice Farman biplane fitted with the new 100 h.p. Sunbeam engine, and also took up the winner of the free passenger flight ballot—Dr. Violet Turner, of the Royal Free Hospital, Gray's Inn Road, London. Mr. Raynham gave some pretty exhibition flights on the Avro biplane. Mr. Dukinfield Jones made a number of flights on the Flanders biplane, as did Mr. Pixton on the Sopwith biplane. Herr Roempler was up a number of times on the D.F.W. biplane, with and without passengers. Mr. Merriam gave some fine exhibition flights on the Bristol biplane, and the Martinsyde monoplane was flying even better than ever.

With the principal schools shut for the Christmas week there has naturally been comparatively little flying done, but Herr Roempler was out several times on the D.F.W. biplane, Mr. Raynham on the Avro biplane, Mr. Dukinfield Jones on the Flanders biplane, and Mr. Alcock on the Maurice Farman biplane, the latter machine flying extremely well and steadily with its 100 h.p. Sunbeam engine in a 33 miles per hour wind, and reaching under favourable conditions a speed of about 90 miles an hour. Mr. Raynham took the 80 h.p.

Avro biplane over to Farnborough where it was officially timed to accomplish the excellent speed of 80.9 miles an hour when carrying passenger and fuel, with a slow speed of 39 miles an hour.

On Sunday only three machines were flying, the Sopwith biplane (Mr. Pixton), the Flanders biplane (Mr. Dukinfield Jones), and the Maurice Farman biplane, with its 100 h.p. Sunbeam engine (Mr. Alcock), on which the winner of the ballot for the free passenger flight, Miss de Carteret, of 33, Birkenhead Avenue, Kingston-on-Thames, had an enjoyable trip in the clear and frosty atmosphere.

Bristol School.—Dec. 15th, 7.45 a.m., Merriam testing, taking Lieut. Bridson as passenger, and found very bumpy.

Dec. 16th, too windy all day for flying. On Dec. 17th, the Wednesday preceding Xmas week, blowing hard all morning. Afternoon, about 4 p.m., became calm. Merriam then for test, afterwards Mr. Macdonell then took certificate in a most skilful way. Merriam afterwards gave a trip to Lieut. Watkins (new pupil).

Next day, at 8 a.m., Merriam testing, taking Lieut. Watkins as passenger. Afterwards up behind Mr. Don on straights and circuits. Mr. Racine Jacques making circuits and half right-hand turns.

Merriam up early testing, afterwards up giving tuition to Lieuts. Watkins and Sanders on straights and circuits, also up behind Mr. Don on figures of eight, &c. (twice). Lieut. Robertson doing fine figures of eight, and v.p. landings, and also Mr. Finney.

After breakfast, Merriam testing, Lieut. Sanders being passenger. Mr. Finney then took his R.Ae.C. certificate very steadily, and making perfect landings to observers.

Lieut. Robertson flying high and figures of eight. Merriam took this pupil up to show him how to make a spiral descent. Afterwards instructor up behind Lieuts. Watkins (2) and Sanders (2), Mr. Don (2), giving all these pupils very long turns. Afternoon too windy.

On the Saturday, Merriam, at 7.45 a.m., testing, with Lieut. Watkins as passenger, afterwards behind this pupil on straights and circuits, later behind Lieut. Bromet (from Salisbury School) on figures of 8 and landings, also behind Lieut. Sanders on straights. Lieut. Bridson then away for his ticket, taking half in fine style. After breakfast Merriam first out, afterwards behind Lieut. Bromet



Mr. H. R. Johnson, who has just passed his *brevet* tests in excellent style at the W. H. Ewen School, Hendon, on a 35 h.p. Caudron biplane.

on figures of 8. Lieut. Bridson then finished his other half of ticket very well indeed, making perfect landing. Merriam afterwards up behind Mr. Don on figures of 8, this pupil having control throughout, including landings. Mr. Don then went for his *brevet*, taking same in first-class style. Merriam afterwards up behind Lieut. Robertson on figures of 8 and landing a *vol plané*. Too windy afterwards for school work.

Afternoon, Merriam testing, taking Col. Driscoll as passenger for a short trip, and found too bumpy for school work, later tried the air again but found still bad.

Merriam testing on Monday morning last week, afterwards up behind Lieuts. Sanders, Watkins, and Bromet, giving them long turns. In the afternoon Merriam giving an exhibition flight, later up with Lieuts. Sanders and Bromet, and Lieut. Halford a solo. Lieut. Robertson doing a fine solo and landing near a mark. Merriam finished with a solo to sheds.

Merriam up first on Tuesday, afterwards up behind Lieuts. Bromet and Sanders on figures of eight, and giving them plenty of landing practice.

After breakfast Merriam behind Lieut. Sanders on figures of eight, and afterwards making several landings. Lieut. Bromet then took his other half of ticket very well indeed. Merriam afterwards up again behind Lieut. Sanders on figures of eight and landings, this pupil having control throughout. Lieut. Robertson up three times on figures of eight.

Merriam up again behind Lieut. Sanders on figures of eight, pupil having full control, and is quite ready to take his *brevet* whenever he wishes.

In the afternoon, Merriam testing first, afterwards Lieut. Robertson practising landings near a mark. Afterwards he took his *brevet* in a most excellent style, landing each test right on the mark from 450 ft. with engine absolutely cut off. Merriam finished up by taking Lieut. Sanders for a high flight.

Ducrocq School.—Tuesday, last week, Jack Alcock passenger carrying for one hour on the Maurice Farman, fitted with 100 h.p. Sunbeam engine.

Wednesday, again passenger carrying in gusty wind, and on Sunday, besides passenger carrying, giving exhibition flying during afternoon.

Eastbourne Aerodrome.

ON Saturday, December 20th, school work commenced early in the morning, Gassler starting out at 8 a.m. for a test flight on the Bristol. Mr. Thornely followed on the E.A.C. 'bus, and did a cross-country stunt; returning, he took up a mechanic, and flew for ten minutes with him. Mr. Hunt then did three circuits, solo, followed by Fowler, with Mrs. Salmon in the pilot's seat. Mr. Thornely was away again shortly afterwards across country. Later in the morning Fowler flew the Bristol to Pevensy, Mr. Thornely

motoring there. They changed over there, and Mr. Thornely flew back, whilst Mr. Fowler returned by car.

Monday morning Gassler was out first on the E.A.C. 'bus. He then took up Mr. Gwynne behind again, with Mrs. Salmon in the pilot's seat, and lastly with Mr. Gwynne at the control. Mr. Hunt then did a solo, making several figures of 8 steadily and well. Fowler went up with Mrs. Salmon in the pilot's seat, and Mr. Thornely took a stunt across the marshes on the Bristol. Mr. Hunt then flew the necessary tests for his *brevet*, which he accomplished in good style and time. In the afternoon Gassler had Mr. Gwynne up in front for several circuits. Mr. Gwynne will now soon be in the solo stage. Mr. Hunt went out again on the Bristol, flying well. Mr. Thornely took the 80 h.p. H. Farman out and made two very good flights at about 1,000 ft.

Tuesday, Gassler started with the E.A.C. machine, followed by Mr. Thornely on the 80 h.p. Farman. Mr. Hunt then went up on the Bristol, and again Mr. Thornely followed on the Henry Farman: rapidly overhauling Mr. Hunt on the school 'bus and climbing to 2,000 ft. in a very short time, he then made an almost perpendicular dive, and flattening out with good judgment, brought the machine up close to the sheds. Wednesday morning, Mr. Thornely out on the 80 h.p. Farman in a strong wind, handling the machine well. In the afternoon, Mr. Thornely again on the H. Farman, and Mr. Hunt on the Bristol, doing some fine banking. Fowler then went out on the Bristol and Gassler had a stunt on the E.A.C. 'bus.

The school was closed from Wednesday evening until Monday morning for the Christmas holidays.

On Monday morning Gassler was first away on the E.A.C., followed by Mr. Thornely on the 80 Farman. Mr. Hunt then got away on the Bristol, but owing to the wind increasing to a gale no more school work was done.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Monday last week, Messrs. Fenwick, Cowley, Clarke, Bjorkland, Norris, straights with Instructor Strange, afterwards Messrs. Norris and Clarke solo straights. Messrs. Cripps and Webb solo circuits and figures of 8.

W. H. Ewen School.—On Monday, last week, school was out at 7.40 a.m. under the instruction of M. Baumann and Mr. F. W. Goodden. After test flight by M. Baumann on *brevet* machine, Mr. Badgery did circuits, right-hand turns, and landing practice, Mr. MacGregor half circuits, and Mr. Murray straight flights. Mr.



"Flight" Copyright.

Chanteloup, the first aviator to loop the loop on a biplane in England, just about to mount his Caudron machine at Hendon on Friday last week.

F. W. Goodden made a test flight on the 35 h.p. Caudron No. 1, after which Mr. Cooper did half-circuits, Mr. Bankes-Price straights, and Messrs. Freshney and Busk were rolling.

During the afternoon Mr. Badgery was out on *brevet* machine, doing figures of eight. He then went through his *brevet* tests in excellent style, making neat figures of eight, landing well, and rising to 300 ft.



CHRISTMAS FLYING AT HENDON.

REFERRING back to our report of the Christmas flying at Hendon a year ago (1912), we commented on the fact that in spite of a 40 m.p.h. wind, two aviators, Marcel Desoutter and Louis Noel made wonderful flights. They were wonderful flights *then*, but such is the progress of aviation now, that although during the Christmas holidays just passed the weather conditions were somewhat worse than on the previous Christmas, looping the loop and marvellous trick flying was the order of the day. B. C. Hucks induced us to look upon looping the loop and upside-down flying as quite commonplace, but the demonstrations given on Christmas Day, Boxing Day, and Saturday last by M. Chanteloup on his 60 h.p. Caudron biplane, make folk wonder what is to come next. Apparently it is all one to M. Chanteloup which way his machine flies out of the ordinary—upside-down, upwards, downwards, sideways, or tail first, in fact he seems to be able to tumble about anyhow, and to do just what he likes with it. There are three outstanding features about his demonstrations, viz., his machine is an absolutely standard Caudron biplane, a military single-seater with a 60 h.p. Rhone engine; he does not wear any straps other than an ordinary safety belt, and he makes a backward loop without any preliminary dive.

On Christmas Day, early in the afternoon, he gave his first demonstration under by no means favourable conditions, for not only was the wind blowing at between 30 and 40 m.p.h., but his engine was not running satisfactorily. He ascended to a height of 1,500 ft., at which height he made his first loop, and then proceeded to make a second, but as he was climbing, the engine stopped. The machine remained in this position, nose upwards, for an appreciable time and then dived, tail first, some three or four hundred feet. He came out of this terrible position by means of a cart-wheel turn and glided safely to the aerodrome. The necessary adjustments having been made to the engine, Chanteloup ascended for the second time and

Shoreham Aerodrome.

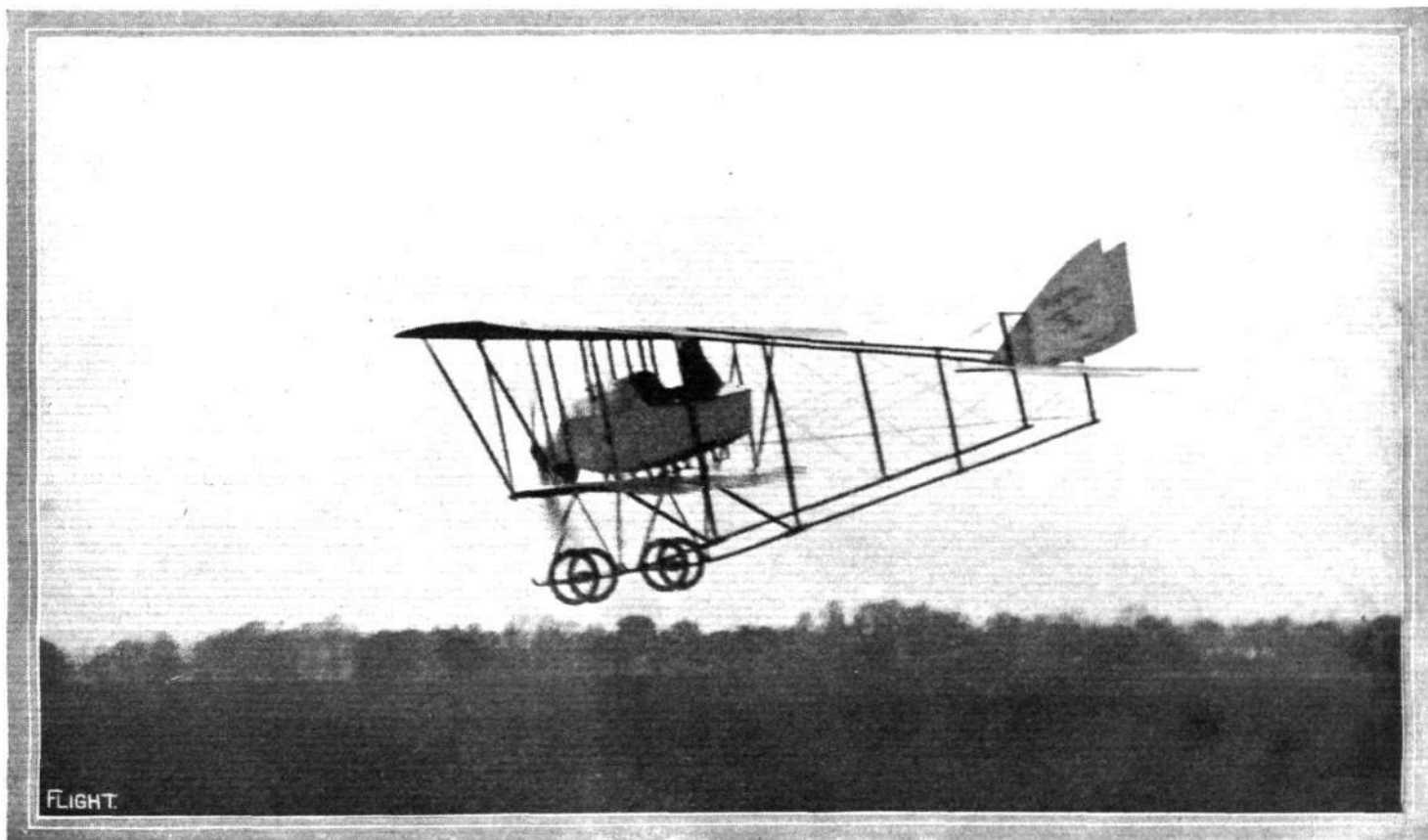
Wind prevailed during greater part of last week, but on Sunday and Monday the weather showed slight improvement, and all pupils came out under the instruction of Mr. Elliott. Lieut. Lucas flies exceptionally well. On Sunday he had one of the Avros up and gave an excellent performance. Purnell and Thompson have been doing good straights, and Cannon can now handle a 'bus in a good wind.



FLIGHT.

"Flight" Copyright.

A plan view, from beneath, of the Handley Page biplane with the tail planes removed.



FLIGHT.

"Flight" Copyright.

Chanteloup descending on his Caudron biplane after carrying out his extraordinary loopings at Hendon on Friday.

put up some astonishing evolutions consisting of perfectly formed loops and side dives. This latter is a kind of *chute de côté*, in which the machine falls some considerable distance sideways before nose-diving.

On Boxing Day the wind increased in violence, but some splendid flying was put up nevertheless, and Chanteloup gave further demonstrations. At noon Philippe Marty ascended on the Morane-Saulnier monoplane, and a little later Louis Noel came out on the 70 h.p. Maurice Farman. Noel was literally lifted off the ground and was blown about in a remarkable manner; on one occasion the machine was forced down fully 200 ft. At 12.30 p.m. Chanteloup ascended on his little Caudron; he also was lifted off the ground as soon as the machine was released. He climbed to about 1,000 ft., and then executed a corkscrew dive to some few hundred feet from the ground. After this he ascended again to about 1,500 ft., and then made two backward loops without any preliminary dive. These loops are very similar to a performing dog turning a somersault. His next evolution consisted of a vertical dive from about 2,000 ft., and this was followed by a *chute de côté*, which terminated his demonstration. Most of the spectators then retired for lunch, but those who remained "on the premises" were treated to another demonstration by Gustav Hamel on his 80 h.p. Gnome-Morane-Saulnier. Shortly after 1 o'clock Hamel ascended to about 2,000 ft. and then executed three semi-loops, that is, he dives, brings the nose sharply up turning the machine over on its back and then falls out of the loop sideways. After these semi-loops he made a complete loop and finished up with a nose dive. On landing a gust caught the tail of the machine and turned it over on its nose. It remained in this position swaying in the wind with Hamel, held in by his shoulder straps, hanging upside down. It was not very long before many willing hands helped him out of his awkward, but by now, customary inverted position. On righting the machine it was found that the propeller and engine-

plate were smashed, but otherwise little damage was done and Hamel was unhurt, but angry.

In the afternoon Noel and Marty again went up on the Maurice Farman and Morane-Saulnier respectively, Marty rising above the clouds, and being lost to view for some time. In the meanwhile the wind had increased to about 60 m.p.h. up aloft, evidence of which was forthcoming when Chanteloup ascended for the second time, the machine, which has a speed of 60 m.p.h. itself, at times remaining quite stationary, and even drifting backwards. On reaching a height of about 1,500 ft., Chanteloup made a nose dive to 600 ft. or thereabouts from the ground, and rising again he executed a number of banks and semi-loops, dropping the meanwhile to 500 ft. He then ascended once more to over 1,000 ft., where he made a "cartwheel," which he followed up with a backward loop, and then descended to earth with a steep spiral dive. He was accorded a splendid ovation on landing, after which the proceedings were brought to a close.

Saturday was again very windy, but still fine, and a large number of visitors turned up at the aerodrome. Just before noon, G. L. Temple left for Uxbridge on his 50 h.p. Blériot. When within four or five miles of his destination he was forced to land and in doing so he was blown between two trees, where the machine was firmly wedged and but slightly damaged. At noon, Philippe Marty ascended with a passenger on the 80 h.p. Morane-Saulnier, and after making an excellent flight in the wind met with an exactly similar mishap to that which befel Hamel the day before. In this case the monoplane had come practically to a standstill, but a strong gust struck it, and the wheels catching in a rut, the machine turned completely over on its back emptying the pilot and passenger out on to the ground without serious injury. The machine itself only suffered a slightly cracked propeller and a bent tail. At 12.30, Chanteloup came out and quickly rose to 2,500 ft., from which height he made an inverted dive to about 1,000 ft., and then rising again he

made a perfect backward loop, following this up with another loop, in which he turned over sideways when at the top of the loop. After this he made three cartwheels and then descended, having been aloft nearly 15 mins. In the afternoon the wind dropped somewhat, and a number of exhibition and passenger flights were made prior to Chanteloup's last demonstration. The first out was Claude Grahame-White, who made a 20-minute flight on the Maurice Farman. He was followed by R. H. Carr on the 50 h.p. G.-W. 'bus, Louis Noel on the Maurice Farman, and Marty on the 50 h.p. Morane-Saulnier. Next came some passenger flights by Carr and Noel, and a splendid display by Gustav Hamel on the 50 h.p. Morane-Saulnier. Hamel executed some wonderful banks, one time making a sharp spiral turn, rising steeply at the same time. Chanteloup then ascended slowly, his engine running somewhat poorly. When about 500 ft. up he made a steep *chute de côté*, and then descended to see to his engine.

After a few minutes he was up again, and climbing to 500 ft. he executed another *chute de côté*, followed by a right- and left-hand spiral side dive. He then climbed to about 1,000 ft., and made one of his back somersaults, after which he climbed to a height of from 3,000 to 4,000 ft., when he made an S dive to 2,000 ft., and then made another loop, finishing up with an amazing vertical corkscrew dive of 1,000 ft. On landing he was taken round the enclosures on the aerodrome car, and received an enthusiastic reception. After this the proceedings were brought to a close with a few exhibition and passenger flights.

Asked to give his impressions of his visit to England, M. Chanteloup said he was more than pleased with the reception accorded him, especially from those at the aerodrome. As to the latter itself, he thought it was an excellent ground, and the air conditions round about very good.

On the Sunday following, the weather was bright and frosty, and there was a good attendance of visitors. Gustav Hamel put up some of his old-fashioned stunt flying on the 80 h.p. Blériot with Miss Trehawke Davies as passenger. E. Baumann made a 6,000 ft. flight on the 60 h.p. Caudron, and Claude Grahame-White was busy taking up passengers on the Maurice Farman. Other pilots and machines up were Louis Noel on the Maurice Farman, R. H. Carr on the 50 h.p. G.-W. 'bus, and Philippe Marty on the Morane-Saulnier.



"Flight" Copyright.

Mr. Whitehouse flying the Handley Page biplane, with the tail planes removed, at Hendon.

ARMCHAIR REFLECTIONS.

By THE DREAMER.

Resolutions.

THIS is the 29th day of December. I know that because I have seen it printed on my morning paper. It also tells me that it is Monday, otherwise I should not know but that it might be any other day, last week having been made up principally of Sundays, with a balance of days that might have been anything. The fact is I have been lost. It has been Christmas. I spent the whole of the early part of last week telling people what I wished them, and the whole of the early portion of to-day has been taken up in enquiries as to whether my wishes had been fulfilled; but my morning paper reminds me that this is all behind me now, and that this is Monday, December 29th, and a solid working day, the first instalment of six solid working days in this week, and I have promised myself not to say Christmas any more, and not to think of holidays till Easter. Of course there is New Year's Day and Eve to come, but I am not sure what or when they are. Hogmanay is nothing of mine, and I don't care a brass farthing who will be the first to enter my simple abode on the morning of the first, or whether he carries a bottle or not.

The maiden I first see on New Year's morning is not at all likely to become my bride before the year is out, in spite of all theory to the contrary. I am strengthened in this refutation from a knowledge of the fact that she is "going out" with the baker's man. I shall not stand shivering in St. Paul's Churchyard waiting for the clock to strike twelve before I can take a "nip." My "fut" is on my native heath all the time; and, anyway, I don't come from that country where the men come from whom I vowed long ago never to call by name again—in short, I am a cockney, and New Year's Eve or Day is but one of 365.

The first of January will come for me, I know, because it is the day on which the income tax becomes due, and I have faith in the assessors that they will see to it that it shall arrive on time, even if they have to invent a new schedule.

Yet, being but one of 365, it is nevertheless a day of great importance to me; it is the day on which I make all those resolutions with regard to the giving up of all that is worth living for, that has kept me in the same groove for—well, no matter how many years. If I had all the pipes I have given away when I gave up smoking I should be saved a deal of expense now in buying new ones; and I always have more cigarettes on January 1st than on any other day in the year. There is the box I left at home in the morning when I gave up the vile habit, and the box I bought on the way to the station when I side slipped again. After all, the making of resolutions must have a strengthening effect on the character, even if they are immediately broken; there is something in recognising one's shortcomings.

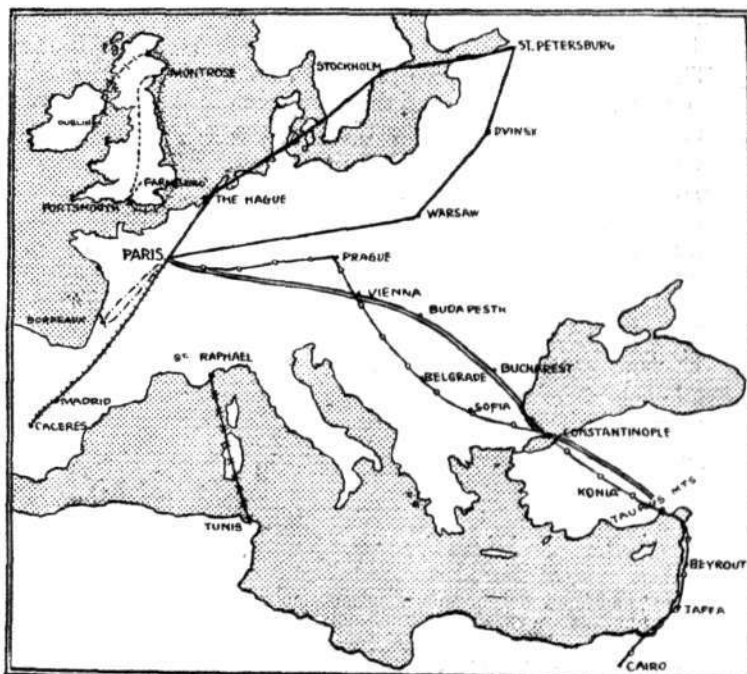
Long-distance Aeroplaning.

It seems but yesterday that the brothers Wright made history by keeping a machine in the air for 59 seconds. Things have progressed considerably since then; but I think the long-distance flights put up by pilots in this and other countries during 1913 outstrip anything in the way of progress in previous years, even taking into account improvements in machines themselves. It would be invidious to single out any particular flight, they have all been so magnificent, but a list of some that stand out pre-eminent, and deserve to be placed on record *en bloc*, may not be amiss.

The recent flight of Vedrines from Nancy, on the

Franco-German frontier, to Cairo, some 3,500 miles, is in itself sufficient recompense for all the trouble and care that has been bestowed on the improvement of both pilot and machine. In addition we have Brindejone des Moulinais, who, on June 10th, flew from Paris to Warsaw in one day, and thence continuing, till July 2nd, to St. Petersburg, Stockholm, The Hague, and back to Paris, covering in all 3,000 miles; M. Garros, on September 23rd, flew 500 miles across the Mediterranean, from St. Raphael on the Riviera to Bizerta, near Tunis, in Africa; M. Gilbert, on August 3rd, flew 870 miles with only one stop, the journey being from Paris to Caceres in Spain. Again, there is the fine flight of Helen on a Nieuport monoplane, who covered 13,060 miles in thirty-nine consecutive days, and the flight of Seguin from Paris to Bordeaux and back, non-stop, when he was in the air for thirteen hours. In England, Capt. C. A. H. Longcroft, on November 22nd, made a non-stop flight with a passenger from Montrose to Portsmouth, and back to Farnborough, a distance of 635 miles, at a speed of 90 miles an hour, and Hawker, in his attempt to win the *Daily Mail* prize of £5,000 for the circuit of Britain, flew from Southampton to Dublin *via* Ramsgate, Yarmouth, Scarborough, Cromarty, Oban and the Irish Channel, covering in all a distance of 1,000 miles.

These are but a few of the more prominent flights accomplished this year, but they show the enormous strides that aviation has made. It is beyond any man to say what will happen during 1914. In all probability next year will see two more expeditions to the South Polar regions, that of Sir Ernest Shackleton and Dr. Mawson.



VEDRINES
2500 MLS

BRINDEJONC DES MOULINAISS
3000 MLS

DAUCOURT
1800 MLS

GILBERT
800 MLS

HAWKER
1050 MLS

CAPT LONGCROFT
640 MLS

SEGUIN
600 MLS

GARROS
500 MLS

Some long distance flights of the year.

In both of these, aeroplanes, and sledges with aerial propeller drive, will be used, which will be a severe test for this form of locomotion under most trying circumstances. To leave one's companions and fly away into the unknown on an aeroplane must require nerves of steel. It is such a fast method of covering distance that no doubt much of the previously impossible will be accomplished. It would, for instance, quickly solve the question as to what was on the other side of huge fields of ice mountains, and for that purpose should prove invaluable; but it must be remembered that there is great danger in flying over these regions where, no doubt,

landing-places are few and far between, and a man might easily fly into a fog or a storm and have to come down, and even supposing that he finds somewhere to land, a slight mishap might place him in extreme danger of not being able to get back. A man who leaves his base and flies off into the Polar Circle, to a very great extent take his life in his hands; but there is never much difficulty in finding men ready to do this, and I have no doubt trouble will not be experienced in that direction; one can only hope that every reasonable care will be taken, and that the airman, or airmen, will receive all they deserve from a not, as a rule, over-generous nation.

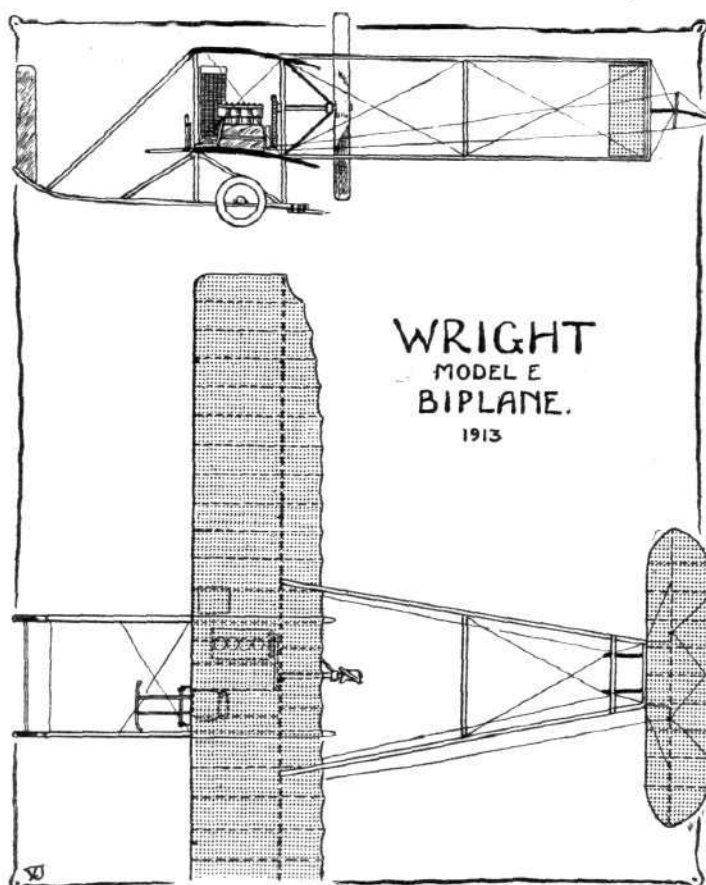
AEROPLANE TYPES.

THE MODEL E WRIGHT BIPLANE.

SOME little time ago the Wright Factory at Dayton turned out a new type of biplane specially designed for exhibition work, which has given very satisfactory results in the air. It more or less follows the usual Wright practice, the only way in which it differs, being that a single propeller is employed instead of the two that have previously characterised these pioneer machines. There are, of course, several differences in constructional details necessitated by the new method of propulsion. One important feature consists of the rapidity with which it can be dismantled and *vice versa*. The planes are built up in three sections or panels, the centre one of which is carried on the chassis and bears the pilot and power plant. The latter consists of a water-cooled 30 h.p. 4-cylinder Wright motor, which is mounted on the lower plane alongside the pilot, on his right, and driving a seven-foot propeller by means of a single chain and a short length of shaft. The propeller is centrally situated at the rear of, and midway between the top and bottom planes, and its shaft is supported by a strut and three steel tie rods. The tail is carried by two pairs of V outriggers connected to the rear spar so that they are clear of the propeller. The tail is of the orthodox Wright pattern, consisting of a single elevator plane with a flexing trailing edge and a pair of directional rudders. Right in front of the machine are two "blinkers," which differ from those on other Wright models in that they are constructed of wood and are rigidly fastened at the bottom to the extremities of the skids. They are connected at the top by a thin tie rod, and the only other bracing required is a pair of diagonal wires from one to the other. The two outer cellules or panels are very easily detached from the centre one, the time taken to dismantle the machine for transport being well under fifteen minutes. The principal

dimensions of this machine are:—Span, 32 ft.; overall length, 28 ft.; chord, 5 ft. 1 in.; supporting area, 316 sq. ft.; weight ready for the air, 730 lbs.

"VEE JAY."



Nieuport Aeroplanes in Great Britain.

A FURTHER addition to the list of British companies handling the best type of foreign designed machines in this country is an accomplished fact. Messrs. Nieuport (England), Ltd., has been established under very sound auspices, the members of the Board being Sir Inigo Thomas, G.C.B., formerly Permanent Secretary at the Admiralty; Col. C. V. Hume, M.V.O., D.S.O., late of the R.F.A., formerly Military Attaché at H.M. Embassy, Tokio; Henri Kapferer, C.E., Knight of the Legion of Honour, the famous pilot, and Director of the Astra Airship Co., which has recently delivered to England the "Astra Torres," the aircraft holding the world's record for speed; Léon Bazaine, Director of the Nieuport Works at Issy-les-Moulineaux; and Albert Picard, Knight of the Legion of Honour, who will fulfil the duties of Managing Director.

It is intended eventually to build the machines in this country, and in the meantime Nieuport monoplanes will be demonstrated at Hendon, and the Nieuport waterplanes at Southampton, some of the best known Nieuport pilots coming over to pilot the machines. It is unnecessary to recapitulate here the fine work done on machines

of this type, but mention must be made of the winning of the International Michelin Cup by Helen, the new height record by Legagneux, the flight from Paris to Asia Minor of Bonnier and it may be added that Dr. Espanet will shortly attempt to beat the speed records on a specially-built 200 h.p. monoplane. We understand that several new machines are now being built in the finely equipped factory and some of them will be seen on the Nieuport stand at Olympia. In this connection it will be remembered that the Nieuport have a licence for constructing the Danne biplane. Apart from Great Britain, other Governments which have purchased Nieuport monoplanes, are the Italian, Russian, Spanish, Roumanian, Bulgarian, Grecian, Japanese, Siamese, Swedish, Argentine, &c., &c. Temporarily the offices of the firm are at 28, Milk Street, E.C.

An Italian Stability Machine.

FROM Turin comes a statement that Dr. Robiola has invented an automatically stable aeroplane, which is shortly to be tried at the Mirafiori Aerodrome. It is said to weigh very nearly a ton, and, fitted with two 80 h.p. Gnome engines, to have a speed of over 120 miles an hour.

AERO ENGINES.*

By GRANVILLE E. BRADSHAW.

THERE is probably no form of prime mover in existence that is more highly stressed, or that has a more strenuous life, than the Aero engine, and there is undoubtedly no engine that has greater claims on reliability.

These facts at once suggest that the aero engine requires greater accuracy of design, wider knowledge of the properties of the materials available for the construction of such engines, and the highest possible workmanship that can be obtained.

It has been said that the modern aeroplane, although not by any means perfect, has already reached a stage of efficiency such that extreme lightness of the power plant is no longer necessary to the evolution of the successful flying machine.

This has appeared in engineering periodicals on several occasions, and it is interesting to note that this form of argument invariably comes from those who have had little, if any, practical experience in aeroplane design, construction, or piloting.

The aeroplane manufacturer's cry for the extremely light engine is probably greater to-day than it has ever been in the history of aviation. The demands of the authorities who purchase aeroplanes are such that probably so much as 90 per cent. of the factors which determine the most successful machine, are governed directly or indirectly by the weight efficiency and fuel efficiency of the engine; by the former is meant, of course, the number of pounds of weight for every horse-power developed. (That the engine shall be extremely reliable is of course taken for granted.)

Amongst the essential features of all successful aeroplanes are the following:—

- 1st. That it shall climb very quickly.
- 2nd. That it shall have a good gliding angle.
- 3rd. That it shall have a combination of fast and slow flying speeds.
- 4th. That it shall be a machine safe to handle in all winds, both with and without the engine in operation.
- 5th. That it shall be able to remain in the air for long periods.

Investigating these in the order just cited, we find that the first essential feature, *i.e.*, "that it shall climb quickly," depends almost entirely on the weight efficiency of the engine. For our purpose, and because the design of the aeroplane does not enter into our subject, I propose to assume the aeroplanes themselves to be of equal efficiency in flight, and working on this assumption it is readily seen that the rate of climb varies directly as the power developed, and indirectly as weight to be lifted. That the aeroplane shall be very efficient in this particular can easily be understood when one remembers that its capabilities of evading destruction from projectiles depend to a great extent on how quickly it can get out of range of such projectiles. It must also be efficient in climbing in order to successfully rise from a small field surrounded by tall trees, which may be necessitated by a forced landing during a cross-country flight over a populous district.

The second essential, *i.e.*, "that it shall have a good gliding angle," or in other words, that from any given height it shall be able to glide for a great distance, is also governed indirectly by the weight of the machine, and consequently by the weight of the power plant, because a machine with a heavy power plant must be designed with a larger lifting surface, and must be stronger in proportion.

With the same lifting surface and head resistance, the angle of descent of the heavy engined machine will be steeper than that of the light machine, as higher speed is necessary in order to support the increased weight.

The third essential feature, *i.e.*, "that it shall have a combination of fast and slow flying speeds" is one of paramount importance, and one that aeroplane constructors are paying probably the greatest amount of attention to.

Just as the fast battleship is infinitely superior to the slow one, so will the fast aeroplane in time of war be able to frustrate and limit the usefulness of the slow machine. To have a machine that will only fly at a high rate of speed, however, is almost useless, and at the same time extremely dangerous.

For purposes of alighting in bad weather on rough and unknown ground, a machine that will not fly at a lower speed than about 70 miles per hour is anything but desirable, such a machine being of course much more liable to be broken up when alighting. The capabilities of a machine to fly slowly as well as fast, depend almost entirely on the adoption of an extremely light and powerful engine. If the machine is designed for very high speed, slow speed is only possible by the machine, and consequently the power plant, being very light. One cannot wonder therefore at the aeroplane constructor crying for a light engine.

The fourth essential, *i.e.*, "that it shall be a machine safe to

handle in all winds both with and without the engine in operation," depends again to a great extent on the weight of the power plant. Aeroplanes have been built that will carry as much as from 15 to 20 lbs. per sq. ft. of supporting surface, but constructors nowadays are agreed that the lightly loaded machine is the safer to handle, and the average loading on the planes is to-day generally in the neighbourhood of 4 or 5 lbs. per sq. ft.

A heavily loaded machine depends to a great extent on high speed of flight in order to maintain it in the air. Should the speed fall (unconsciously to the pilot) through loss of engine power, or from any other cause, the control becomes sluggish, and will not answer quickly, the aeroplane, unless the nose is put down very quickly to increase the speed, flounders about like a log in the sea, and generally ends in a sideslip and one of those terrible nose dives that have deprived us of so many of our best pilots.

The life of the pilot of the heavily loaded machine is more dependent upon the good behaviour of the engine than is the life of the pilot of the lightly loaded machine, and the latter could probably go on flying in search of a good alighting ground with two or three of the cylinders not firing at all.

The fifth and last essential, *i.e.*, "that it shall be able to remain in the air for long periods," depends chiefly upon the oil and petrol consumption of the engine, and without efficiency in this respect the extremely light power plant is practically useless, as flights of only a few minutes' duration are not likely to be of much use in serious warfare.

All the essentials just enumerated, and particularly the last, depend, of course, on the engine being absolutely free from any breakdown, which point has not been dealt with, as it is not a debatable one. We are all without doubt of one mind on this matter.

The foregone, to the writer's mind, proves that the light engine is not only desirable but essential. Competition demands it, the man who has to fly the machine demands it, and the nation demands it. There can be no doubt that the nation will be foremost in aviation which can produce the lightest, the most economical, and the most reliable aero engine.

We occasionally read in periodicals devoted entirely to automobilism, that if some of our car engine designers, who are so successful on the track and on the road, were to turn their attention to aero engines for a little time, and slightly modify the designs of their most successful racing engines, we should immediately have the perfect aero engine, and the aeroplane constructor's quest would be at an end.

Indeed, there seems to be an impression in automobile circles that the aero engine designer is a freak inventor with most weird and unmechanical ideas of making the cylinders run round the crankshaft, or of building engines of peculiar shapes, more with the idea of giving vent to their ingenuity than with a determination to evolve a successful engine.

As a matter of fact there is hardly a successful aero engine designer in existence who has not tried at some time or other the adoption of car practice to aeronautical purposes, and found in a remarkably short space of time that in designing aero engines he must first dismiss from his mind all thought of automobile practice. And really, when one comes to look at it in the light of the five essential features of a successful aeroplane, already dealt with, the aero engine must be built on lines almost directly opposite to those of the present-day high-speed car engine.

Just at the moment there appear to be three schools of thought in aero engine design.

The first builds an engine of very large capacity, and arranges induction and carburation so that little brake horse-power is developed for the cylinder size. By this means it is found that the weight can be cut down to a greater extent than the horse-power, but at the same time bearing surfaces are as large as if the engine were double the power, and consequently the life of the engine is very great. This type of engine must always be the most reliable, as it is like any other engine running on two-thirds throttle, and is at the same time easily kept cool. It is generally in the form of a rotary cylinder, or radial stationary cylindered engine, with air-cooling, but it has its disadvantages.

In the first place it uses as much oil as an engine developing the full power of the cylinder capacity, and if it is a rotary cylindered engine it often uses more. Secondly, it is like an engine running on about two-thirds throttle, and the petrol consumption is consequently high per brake horse-power developed. It is also difficult to see just at the present how such engines will work in when high powers are required, such as say 300 to 400 horse-power. The size in this case will be considerable, and may lead to difficulties in fitting.

* Paper read before the Scottish Aeronautical Society, on Wednesday, December 10th 1913, at the Engineers and Shipbuilders Institute, Glasgow.

This form of engine is ideal for short flights up to say one or two hours; it is also particularly suitable for trick flying and exhibition work.

The second school builds an engine with a particular view to all-round efficiency, especially with regard to petrol and oil economy, and an absence of the need for a specially trained mechanic in constant attention. It is generally of the vertical or "V"-type, with parts as light as is consistent with reliability, and it generally develops about 80 per cent. of the maximum power obtainable from an engine of its size. It is not so light as the first type of engine mentioned, but the whole outfit is lighter when both are carrying enough oil and petrol for a flight of four hours or more. It is sometimes air-cooled, and sometimes water-cooled, and runs at 1,300 or 1,700 revolutions per minute; in the latter case gearing is interposed between the engine and propeller.

The third school, which is not very much in evidence, builds an engine of more or less automobile practice, with heavy cast-iron cylinders and solid parts throughout. The weight efficiency of the engine is obtained by running the engine at a high speed, by large and quick lifting valves, by high compression, and by perfect tune. It runs at about 2,400 r.p.m. or possibly more, is water-cooled, and is more or less an orthodox car engine, lightened in external fittings. Its chief disadvantages are that in getting the last 10 per cent. of power it is probably stressed 25 per cent. more.

Experience has shown many times that an engine will run up to a certain horse-power regularly and reliably, whilst an attempt to get the last ounce of power often ends in the engine breaking up altogether.

The greatest disadvantage of this type of engine, however, is probably its propensity for getting out of tune. Such an engine seems to think nothing of dropping 100 revolutions from one day to the next with no apparent reason, and this probably the worst danger to flying. The pilot possibly knows it, but risks it occasionally, but such risks ought not to be offered to him.

Occasionally racing cars do 12 hours all out on Brooklands track, and this is claimed as an exceptional performance, which of course it is, and which few manufacturers succeed in doing at the first attempt, even if they succeed at all.

On the other hand, any and every aero engineman, any and every day, has to be capable of doing this if called upon, and whilst the car engine in its 12-hour run is allowed several short rests by being throttled down every two or three hours to fill up and change tyres, and has the best experts from its factory looking after it, the aero engine, on the other hand, has to do the 12 hours or more in the hands of inferior mechanics and without a moment's rest of any sort. With all this, the aero engine must be some 40 or more per cent. lighter than the car engine.

Racing cars nowadays invariably run in classes, and they are designed solely with the object of obtaining the maximum brake horse-power out of a certain and limited cylinder capacity. To carry this practice into aero engine design is to quite unnecessarily handicap oneself, because aero engines are not tied down to capacity, the only features being desired are low weight per brake horse-power, low oil and petrol consumption, and absolute reliability.

To ever hope to obtain the same reliability from a hard worked engine as from a lightly loaded one, is of course unreasonable, and for this reason the first type of engine we referred to has had the greatest measure of success so far.

Whilst the highly stressed engine has to be carefully kept in perfect tune by constant attention in order not to show a falling off in power, the engine of very low horse-power per cylinder capacity will run for months without any appreciable drop in revolutions. In fact the average rotary motor has something seriously wrong with it when it has dropped as much as 20 revolutions per minute.

Some Government departments are demanding (and quite rightly) that all engines shall pass a ten-hours full throttle test and that the brake horse-power shall not vary more than 3 per cent. above or below throughout the whole ten hours, the control levers not being touched during the run. This will probably do more good in evolving a successful engine than anything else, as it not only compels the designer to make an engine that will run for twelve hours, but covers points with regard to sharp cams and weakening springs, occasional mis-firing, badly designed or gummed up piston rings, burnt exhaust valves, loss of compression, &c.

It is generally accepted that we should have been flying twenty or thirty years ago had there been any engines in existence, and just as the birth of the aero engine has made practical aviation possible, so will the advancement of the aero engine on proper lines help to bring about perfection in aeroplanes.

The engine is, of course, a much more difficult proposition than the aeroplane, and whilst aeroplanes can be designed and built in a few weeks with a certainty of flying, and flying well, at the first or second attempt, the engine is only evolved at the expense of many months, and more often years, of experiment.

The use of proper materials is perhaps the first and foremost thing

to consider, and it is rapidly being brought home to engine manufacturers that steel is the only reliable and light material for its strength that can be found. Cast iron and aluminium alloy are the two last materials one should think of using when reliability is such an essential feature. Aluminium may be light in itself, but taking weight for strength it is some six or eight times as heavy as good quality steel. Cast iron, on the other hand, is neither light nor strong, and is at the best of times very treacherous and uncertain.

Probably another two or three years will see cast iron, phosphor bronze, cast aluminium, and all such metals entirely discarded by aero engine manufacturers, and it is not surprising to note that the most reliable and consistent, as well as the lightest, engines in use to-day are constructed almost entirely of steel.

Having realised that extreme lightness combined with strength to resist fracture, is the chief factor in aero engine design, one would think it very natural for the designer to ask himself, at the very beginning, "What material is the lightest for its strength and at the same time the most consistent?" The reply would be without hesitation—Steel; and more especially when one realises the enormous tensile strength of some of the steels obtainable to-day. Here is the danger of following automobile practice and in not appreciating the totally different conditions of the two subjects. One can quite easily be led into using cast iron cylinders on cast aluminium crank-cases, when a few moments' thought would convince one that an engine so designed, although it may be excellent in its way, has not the faintest chance in competing in lightness and reliability with the engine using materials some ten times stronger. The sooner we in this country realise this, the sooner shall we be in a position to prevent our orders for engines going abroad. It is interesting here to note that the one part of a racing car engine that is required to be as light and as strong as possible (I refer to the piston), formerly cast iron, is now almost universally replaced by steel.

With regard to the various types of engines already in existence, we all gave our own ideas as to what we think will be the ultimate type, but it is of course impossible for anyone to predict what the future will bring. As to whether or not the air-cooled engine will outlive the water-cooled one, appears to depend entirely upon the question of whether the principle of air-cooling will be so perfected that it can compete with water-cooling in all the latter's best points.

I have no hesitation whatever in saying that if air-cooled engines can be made that will be as economical on oil and petrol for flights of 15 hours or more, that will have valve gear as reliable and free from loss of strength in valve springs and lengthening of valve stems, that will not require any greater amount of attention and tuning up, that will not require dismantling and cleaning out more often, and that will have as long life as the water-cooled engine, then the air-cooled engine will survive. If water-cooling can be done away with without any sacrifice, it will most assuredly not be retained. Water-cooling may be necessary for seaplane work, but even then if the cylinders of an air-cooled engine can be made to withstand, after running for several hours, a cold plunge under salt water without distortion or other damage, water-cooling will die a natural death. Whether the air-cooling advocates will succeed as far as this remains to be seen. At the same time it looks rather unlikely that the believer in water-cooling will stay where he is and let air-cooling catch him up.

At the present time water-cooled engines are at a disadvantage owing to the difficulty of obtaining very light radiators that will stand a little rough usage without leaking, and these same engines have been greatly handicapped in the past through machines not being designed with proper provision for a suitable radiator. The machine has been designed by one, the engine by another, and the radiator by a third, with the result that in assembling the machine the radiator has been hung in some position suitable for the machine, and often quite unsuitable for the engine. This has involved the use of unnecessary and long water-pipes, and of numerous rubber joints, with the result that water leaks and air-locks in the water pipes have occurred, and the engine through no fault of its own has been given a bad name.

The near future promises to remove all this, and automobile practice in this one instance is aiding the water-cooled engine. Radiators of the honeycomb type are now being fitted either immediately in front or immediately behind the engine, with a better head of water above the cylinders, and a great reduction in length and number of water-pipes and joints.

The question of the shape of engine most suitable for an aeroplane does not arise so much from the aeroplane constructor's point of view to-day as it did formerly. The average aeroplane fuselage is now so large that any engine within reason can be tucked away without projections to offer head resistance, and the matter of shape lies chiefly with the engine designers, except in the case of some stationary radial engines, which require the air from the propeller to cool them. In this case the cylinders, in order to function properly, must offer head resistance, with a consequent reduction in flying speed.

(To be concluded.)

BRITISH NOTES OF THE WEEK.

THE ROYAL FLYING CORPS.

The following appointments were announced by the Admiralty on the 21st ult. :—

Carpenter W. A. Hancock, to "Pembroke," additional, for Calshot Naval Air Station, undated.

Royal Naval Reserve.—Henry R. Busteed, appointed Sub-Lieutenant for First Reserve of the Naval Wing of the Royal Flying Corps, Oct. 4th.

Christopher Draper, appointed to "Pembroke," additional, as Probationary Sub-Lieutenant, for course of instruction at Central Flying School, Jan. 27th, 1914.

The following were announced by the Admiralty on the 23rd ult. : Sub-Lieut. J. R. Smith-Pigott, to the "Pembroke," additional, to date December 20th, and for course of instruction at the Central Flying School, to date January 27th.

Fleet Paymaster F. Lenn, to the "Pembroke," for headquarters of Naval Wing of Royal Flying Corps, to date December 24th.

Assistant Paymasters A. A. Robinson and L. D. McKean, to the "Pembroke," additional, for headquarters of Naval Wing of Royal Flying Corps, to date December 24th; and R. J. Cosway, to the "Orion," to date December 29th.

The following was announced in the *London Gazette* of the 23rd ult. : **R.F.C.—Military Wing.**—*Establishments, Inspection Department.*—Maj. John D. B. Fulton, Royal Artillery, from an Instructor at the Central Flying School, to be Chief Inspector. Dated December 17th, 1913.

The following was announced by the Admiralty on the 24th ult. : Lieut. B. D. Ash, to "Pembroke," additional, December 23rd, and additional, for course of instruction at Central Flying School, January 27th, 1914.

The following were announced by the Admiralty on the 28th ult. : Com. F. R. Scarlett, to "Pembroke," additional, for temporary duty as Inspecting Captain of Aircraft, December 23rd.

Sub-Lieut. F. E. T. Hewlett, to "Pembroke," additional, for Isle of Grain Air Station, as Flying Officer, December 23rd.

The following was announced by the Admiralty on the 30th ult. : Capt. P. Owen, R.M.L.I., to the "Pembroke," for Central Air Office, Sheerness Sub-Depôt, on the "Hermes" paying off.

ROYAL FLYING CORPS (MILITARY WING).

WAR OFFICE summary of work for week ending December 20th :—

No. 1 Squadron.—Work was carried on as usual during the week.

No. 2 Squadron.—There was a certain amount of flying on B.E.'s and Maurice Farman, but the week was chiefly devoted to moving aeroplane hangars to the new aerodrome and erecting them there. Capt. Dawes and a passenger flew from Montrose to Farnborough on a M. Farman, arriving on the 18th.

No. 3 Squadron.—The pilots of "A," "B," and "C" flights were flying daily throughout the week—1,174 miles in all were flown. Lieut. Wadham went up to 9,500 ft. with a passenger on a Blériot on the 15th.

No. 4 Squadron.—"B" and "C" flights were at work daily during the week carrying out reconnaissance and instructional flights.

No. 5 Squadron.—The B.E.'s and M. Farman were flown daily. The detachment which has been at Dover for several weeks returned to Farnborough during the week.

Flying Depôt.—Experimental work on various lines was continued. There was some flying on B.E.'s and M. Farman.

R.F.C. Naval Wing on Holiday.

THE fourteen days' leave granted to officers and men at the Naval Flying School, Eastchurch, and the other naval air stations round the coast, expires on Monday, when active work will again be recommenced.

New R.F.C. Appointments.

FROM the list of appointments to the Royal Flying Corps which appears elsewhere, it will be seen that an inspection department has been created for the Naval Wing, and Commander F. R. Scarlett has been appointed temporarily as the first Inspecting Captain of Aircraft. Similarly, Major J. D. B. Fulton, R.A., who has been acting as an Instructor at the Central Flying School, has been appointed a chief inspector in the Military Wing.

The "Hermes" Paid Off.

Two days before Christmas, the light cruiser, "Hermes," which was commissioned as the parent ship of the Naval Wing of the Royal Flying Corps, was paid off at Chatham, and it is not expected that she will again be employed as a commissioned ship. The headquarters of the Naval Wing have been transferred to the Naval Sub-Depôt at Sheerness.

A Window of Thanksgiving.

As a thank offering for the safe recovery of Mrs. de Beauvoir Stocks from the effects of the recent smash at Hendon, Mrs. Ernst,

her mother, has given a stained glass window to the new church of St. Michael, Golders Green, N.W.

The Sunbeam-engined Farman at Brooklands.

DURING the week before Christmas, some fine flights were made on the Sunbeam-engined Maurice Farman, piloted by Jack Alcock, the work including one cross-country trip of over two hours with a passenger, and another of an hour and a half, during which the wind was very gusty.

Speed Range on an Avro.

ON the 22nd ult., Raynham was flying the 80 h.p. Avro at Brooklands, and with a passenger and three hours' fuel was timed to do a speed of 83 miles an hour, and subsequently 30 miles an hour, showing a speed ratio of 2.77, or, in other words, the high speed was nearly three times greater than the slowest. Raynham also climbed 5,000 feet in 9 minutes, an average climbing speed of over 500 feet a minute. By removing the passenger's and pilot's wind screens he found that the speed was increased by 4 miles an hour.

"Le Tourisme Aérien."

SUCH is the title of the latest book issued by the Farman Brothers, and it surely conveys a deal of meaning. The book, which is a most beautiful specimen of the printer's art, opens with a description of a trip with Maurice Farman round the Loire Valley, written by G. de Pawlowski, and illustrated by a fine series of photographs, taken from the aeroplane, of the different *châteaux* and other features of interest in the district. This little story emphasises the widespread use which could be made of aeroplanes for touring purposes, and our readers will remember that the brothers Farman have been in the habit of making such a trip as is described practically each week-end during the summer. The second half of the book deals with the Farman schools and works and the different types of Farman machines, and is in fact a catalogue, although, as we have indicated, the beautiful style and arrangement of the book almost precludes the use of such a word to describe it. The mere handling of it conveys the idea of prosperity. Those who wish to have a copy should apply to Farman Freres, Rue de Silly, Billancourt, Seine, or to the Aircraft Manufacturing Co., Ltd., 47, Victoria Street, S.W.

Hucks at Liverpool.

ALTHOUGH the wind was blowing about 50 miles an hour, B. C. Hucks fulfilled his engagement, and looped the loop, &c., at Aintree racecourse on Boxing Day. Gordon Bell also did some clever flying in the high wind, and later in the afternoon, when the wind was still stronger, Hucks went up again for about five minutes.

G. L. Temple at Uxbridge.

ON Saturday, G. L. Temple flew against the strong wind to Uxbridge, the trip taking exactly one hour, and very bad weather being encountered. On arrival there a forced landing was made in an exceptionally small field, it being necessary to bring the machine in between two trees. One wing actually touched a tree, but the machine was quite undamaged.

An Address Wanted.

THE Editor would like to have the present address of "Cruiser Squadron" who in June last wrote a letter which appeared in FLIGHT under the heading of "Aeroplane v. Dreadnought." There is a communication awaiting him at this office.

Mr. Coan's Season's Greeting.

THE little photograph below gives an idea of the charming aluminium fruit dish which Mr. Robert W. Coan, of 219, Goswell Road, E.C., is sending round to his customers by way of a season-



able greeting. It is a fine example of Mr. Coan's work in pure aluminium, and in case of any of his customers having been missed, he would be glad to hear at once, so that he may send along the little gift forthwith.

FOREIGN AVIATION NEWS.

An Italian Height Record.

AT Busto-Arsizio, on the 18th ult., Capt. Picco, on a Nieuport-Gnome, beat the Italian height record by getting up to 3,800 metres. The ascent took half an hour, and the return to earth about fifteen minutes.

Vedrine Reaches Cairo.

LAST Monday afternoon saw Vedrine arriving at Cairo on his Blériot monoplane on which he started from Nancy on November 20th. After a fortnight's rest at Constantinople he left the Turkish capital on December 19th, and made a non-stop flight of 650 kiloms. to Konja. Four days later he stopped, after flying 550 kiloms., at Tartus on the coast of Palestine, and the following morning flew on the short distance to Beirut, where he was accorded an enthusiastic reception. His crossing of the Taurus mountains, the peaks of which were covered with snow, had to be made at a height of 3,500 metres. Last Saturday saw the completion of another 250 kiloms. to Jaffa, while on Monday Heliopolis was reached, a circuit being made over Cairo before descending at the aerodrome. Vedrine now states that it is his intention, after spending a fortnight at Cairo, to start on another stage of his world-flight, and proceed by way of Jerusalem, Aleppo, Bagdad, Bombay, Calcutta and Singapore to Australia. From there he intends to take ship to America and fly across America.

Bonnier also Progresses.

MARC BONNIER, on his Nieuport monoplane, set out from Constantinople to follow Vedrine, on the 20th, but in landing at Eskisher he damaged his propeller, which delayed him a couple of days, when he flew to Konja. He completed a further stage, including crossing the Taurus mountains, to Beirut on Tuesday, and from there will go on to Bagdad.

Paris to the Alps by Aeroplane.

BIDER, the Swiss pilot, who has made many fine flights among mountains, on Christmas Day flew from Buc, near Paris, to Berne on a Blériot-Gnome machine. The total time taken for the journey of 310 miles was 5½ hours. For the greater part of the journey Bider was at an altitude of 2,000 metres flying above the clouds.

With the Loopers.

ON the 21st ult., a new looper was seen at Buc. Olieslaegers, the Belgian pilot, having returned to aviation after a two years' rest, and studied under M. Blériot, making several successive loops in a very clean fashion. His exhibition was varied by a series of experiments with the Blériot safety parachute with dummies liberated from a machine piloted by Bidot. On the same day "looping" flights were made by Hanouille on his Blériot at Marseilles, Chevillard on a Farman at Lyon, Garros on a Morane at St. Raphael, Chanteloup on a Caudron at Nantes, and Poulet, also on a Caudron, at the Borel ground at Chateaufort. At the last mentioned place Galtier was also to have given an exhibition on his Caudron, but the weather became too misty. Chanteloup also looped the loop at Rennes on the 28th ult. On Christmas Day Damerjony gave a display on his Blériot at Madrid, which was witnessed by King Alfonso.

Pegoud Loses Himself.

DURING the afternoon of December 24th, Pegoud gave a display on his Blériot at Buc, and after flying upside down for about two minutes, disappeared among the clouds. As he did not return the neighbourhood was searched by the aid of motor cars, but without result. His friends were relieved to hear the hum of the motor of the returning machine about two hours later, and it then turned out that, having lost his way, he had to come down at Fort Villeras for petrol.

Guillaux Loops the Loop above Paris.

GUILLAUX celebrated Christmas Day by looping the loop above the French capital. Setting out from the Clement ground at St. Cyr on his Blériot, he flew to Issy, then to Buc and back to St. Cyr, making loops at each place, and two loops while flying over the Seine between the Alexandre III and Concorde Bridges. The trip lasted 1 hr. 5 mins. He also looped the loop at St. Cyr on the following day.

Renaux Again Crosses the Channel.

ANOTHER trip across the Channel on a M. Farman seaplane intended for the British Navy was made by Renaux on the 20th ult. Accompanied by Mme. Renaux he started from Boulogne and alighted safely at Harwich.

Testing the New Schmitt Biplane.

IN the presence of Lieut. Cattaneo of the Italian Army, Garaix was testing the Schmitt biplane, which, it will be recalled, has an arrangement for varying the angle of incidence of the wings, at Chartres on the 23rd ult. The fastest speed was 83·736 kiloms. per hour, while the slowest was 39·122 kiloms. per hour, giving a speed range of 1 to 2·12.

Fast Climbing on a Voisin.

TESTING, at Mourmelon, a Voisin biplane fitted with 80 h.p. Gnome, and built for the French Army, Rugere, on the 23rd ult., climbed 1,000 metres in 13 mins. 45 secs. It is claimed that it is the first time that a military biplane fitted with a motor of this power has climbed 1,000 metres in less than a quarter of an hour.

The Blériot School at Pau.

FLYING is now in full swing for the winter season at the Blériot school at Pau, and some very good cross-country work is being done. On the 26th ult., Carnoy traversed the triangle Pau to Saut de Navaille-Orthez and back to Pau; Nautet went to Lourdes and back, as also did Housseland. Carnoy also went to Aire-sur-Adour, and covered the circuit Pau-Lourdes-Tarbes-Pau.

Aerial Touring on Farmans.

ON the 26th ult., Henry and Mme. Farman, Barbaroux, and Senouque on their Farman machines made a fine flight from Buc round Dreux, Chartres, and Orleans, eventually returning to Buc.

Aeroplanes in War in Morocco.

THE Spanish Army are making very effective use of their aeroplanes in the operations against the Moors. Some bombs dropped on the mass of the enemy during a fight near Tetouan on the 17th ult., had terrible effect. Bombs dropped from an aeroplane also effectively put an end to a scheme of blockhouses which the Moors were trying.

A Belgian-German Waterplane Event.

UNDER the title of the Three Rivers Circuit, the Royal Belgian Aero Club, in conjunction with the German Aerial Federation, is organising a contest for waterplanes. It is proposed that the first day the route should be from Brussels to Nimegue, 281 kiloms., the second day to Duisburg and Dusseldorf, 132 kiloms., the third day to Liege, 160 kiloms., the fourth day to a circuit of 340 kiloms. to Mezieres and Charleville, returning to Liege, the fifth day to Rotterdam, 233 kiloms., and the sixth day to Brussels. It is anticipated that the prize money for this event, which should take place at the end of June, will be at least £4,800.

Long Flights in Germany.

IN connection with the prizes offered by the National Fund Committee in Germany, three fine flights were made on December 26th. Heller, at Bonn, made a flight of 4 hrs. 28 mins.; while at Lohausen, Beck was up for 8 hrs. 6 mins. Leaving Mayence with a passenger, Schwobn flew via Alzey and Mannheim to Heidelberg, a distance of 215 kiloms., in 2 hrs. 4 mins.

Night Flying by Italian Officers.

A GOOD deal of practice in flying after dark is being indulged in by officers of the Italian Army stationed at Rome. One fine flight was that made by Lieut. Raffaelli on a Farman-Gnome last week. Leaving the Santorel Aerodrome at 10.30 p.m. he flew over the city for about an hour at a height of 900 metres.

A New Sikorsky Biplane.

A NEW giant biplane, to take fifteen passengers, has now been built by Sikorsky, and during its first trials it carried four, six, and eventually ten passengers, together with petrol and oil, totalling to 384 kilogs. The machine has a span of 37 metres, it is 20 metres in length, while the lifting surface is 182 sq. metres, and the weight, empty, 3,500 kilogs. The fuselage resembles in general appearance that of the Nieuport monoplane. On each side of the fuselage are arranged two 100 h.p. Argus motors. As during these first tests the ground was covered with snow, the wheels were removed and the skids relied upon for landing.

Fast Flying in Russia.

NEWS comes from Russia that on Sunday last Capt. Tchekhovtsoff, on a biplane, covered a distance of 95 versts in 27 mins., which works out to a speed of 139·89 miles an hour.

St. Petersburg to Paris Flight Proposed.

ON the Morane-Saulnier monoplane, on which he recently flew from St. Petersburg to Moscow and back, the Russian pilot Vassiliev proposes to fly from St. Petersburg to Paris by way of returning the visit which Brindejonc des Moulinais made to the Russian capital last July. Up to the present, however, the German authorities have absolutely refused to give any permission to fly over German territory.

A New Russian Prize.

PRINCE ABAMALECK LAZAREFF, who offered the Romanoff prize of £1,000 for a flight from St. Petersburg to Moscow and back in 48 hours, has now offered a similar prize, which will be given to the aviator who flies from St. Petersburg to Sebastopol or vice versa, before January 1st, 1915, within a maximum time of 24 hours. The distance is something like 1,500 miles.

Models

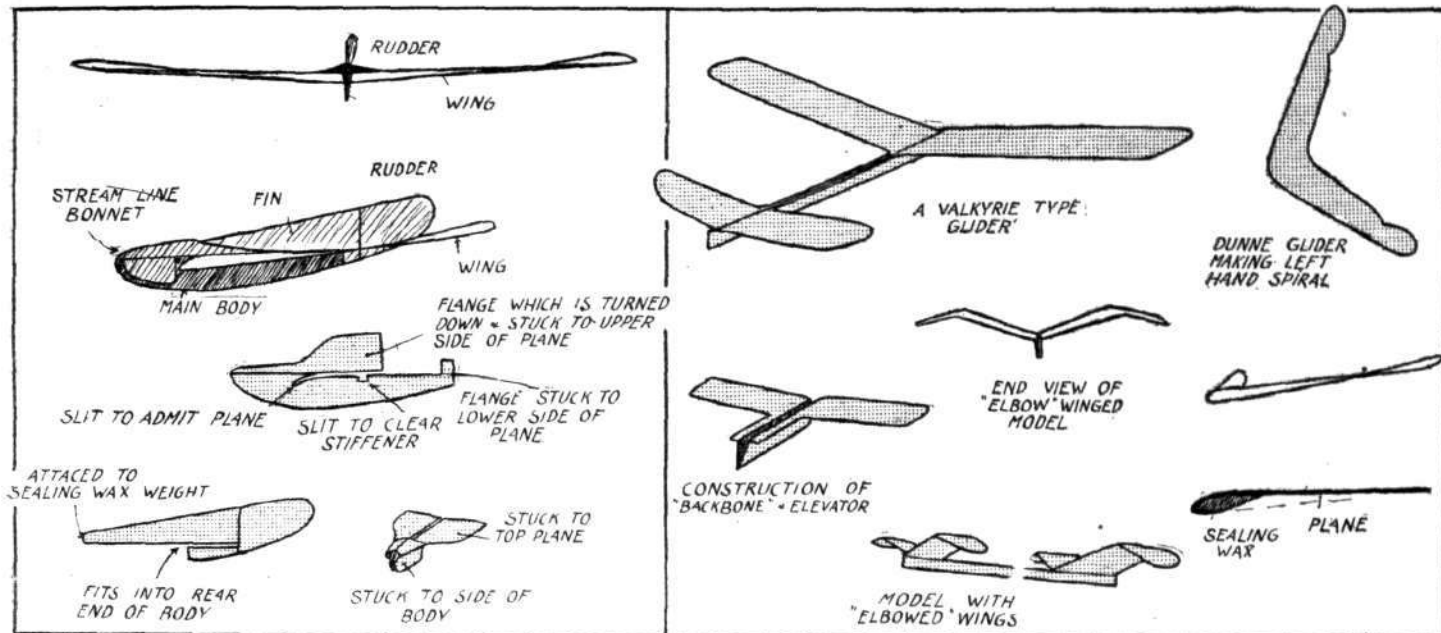
Edited by V. E. JOHNSON, M.A.

Some Experiments with Paper Gliders.

By R. H. HUTCHINGS.

It would be interesting to know how many of the well-known types of aeroplanes at present flying were elaborations of experimental models. That in the early stages of flying the model played an important part seems certain. Of all models the glider in

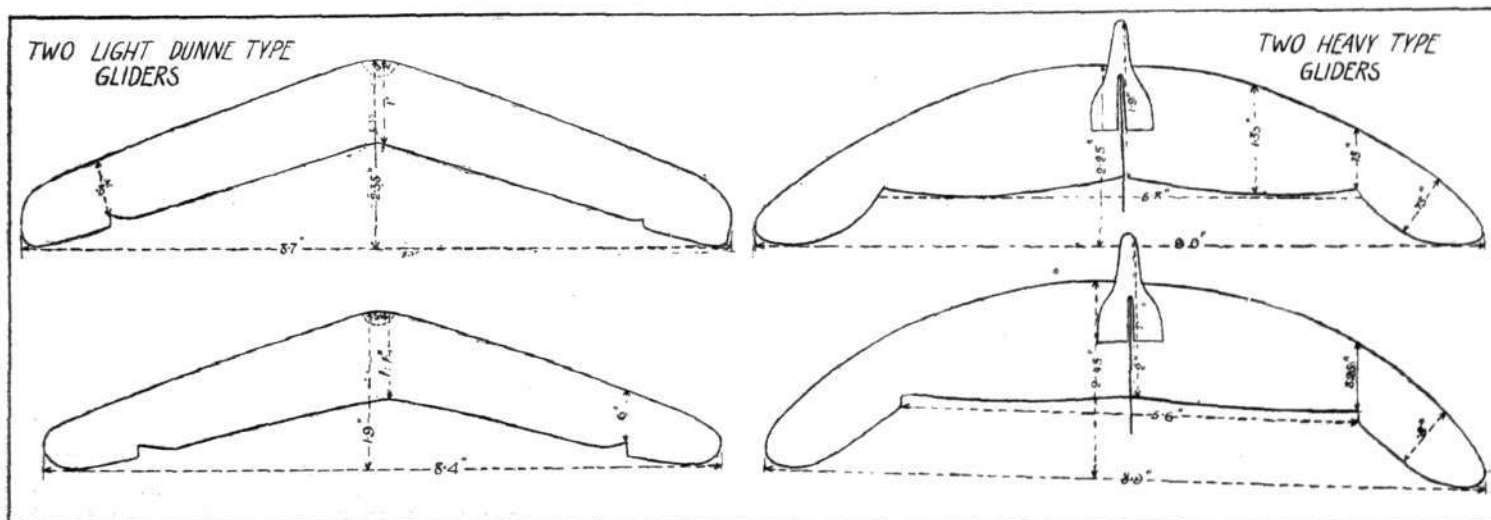
none of this type was a success. The gliding angle was about 1 in 4. I found that if the elevator was banked in the direction in which the model was required to turn, the model would turn perfectly well and steadily without any rudder. Fins and rudders, as a matter of fact, were never used with advantage on these models. Cambered planes were not successful, probably, I think, because the



certain respects, perhaps, takes quite as prominent a position as any other.

For ease of construction and convenience of flying nothing touches paper gliders. They can be constructed in a few moments, flown indoors, altered with the greatest ease and cost practically nothing. A few designs and remarks which I venture to add may therefore, I hope, be of some interest to your readers. The first ones which I constructed were on the Valkyrie principle. They were cut entire from ordinary notepaper of medium thickness and had a certain amount of rigidity. The chief point in their construction was the

models were so light that the increased "drift" re-istance was not counterbalanced by any appreciable improvement in the lifting qualities of the planes. I noticed that the longer the body was the more steady the model was longitudinally. My next models were of the Dunne type, and although small (about 6-in. span) they showed a great improvement in stability and later on in gliding angle. These models were made of the same material as their predecessors, but with no "body." They relied on the down turned leading edge for the necessary stiffness of the planes. They were weighted with sealing wax. If the front edge



girder-shaped back-bone, which is one of the lightest and strongest paper constructions possible. I have no dimensions to hand of these models, but the planes were not cambered, had a decided dihedral angle and the ratio of the elevator area to that of the main plane was very nearly 1 : 3. In order to obtain better stability in these models, I tried a gull's wing-shaped plane with a pronounced "elbow." It was certainly an improvement, but as outdoor models

is curved down before the sealing wax is applied, it will hold the plane in its proper position, which saves a lot of trouble with stiffeners, &c. In their most satisfactory form the angle formed by the planes was slightly less acute than that of the actual Dunne monoplane. If the leading edge was too sharply down-turned I found that the models dived straight down, and if the trailing edge was cambered the same thing occurred. The whole plane, with the

exception of the leading edge and the negative tips must be without any angle of incidence whatever. On models of a very small aspect ratio I tried a cambered wing, but with no improvement in gliding angle, and the stability of the models was not nearly so good. The steering and elevation were performed by the wing tips. To turn to the left, for instance, the negative angle of the left tip was increased, the object being to bank the model, which then turns automatically. A very pretty feature in the gliding of these models is their ability to perform perfect spirals. Even the smallest models of this type flew very satisfactorily out of doors as well as in. The larger models travel about 40 to 55 ft. when launched from the hand, with a duration of 5 secs.; their gliding angle being about 1 in 5.5. Their ability to cope with quite a sharp breeze was really remarkable in such light models. Their chief disadvantage was that if "banked" by a gust they would turn in the direction of the bank before recovering, the consequence being that it was very difficult to get a straight glide into a wind. When gliding with the wind this tendency was less noticeable. Interested by the stability shown by this type of model, I started experimenting with some gliders founded on the Weiss or Etrich principle. The method of construction of these models was almost identical with that used in the Dunnes, with the exception of the different shaped wings. Their behaviour was almost identical so far as stability and management were concerned, but their gliding angle was better—1 in 6.237 being the record for this light type. Considering that the span was only 6 to 8 ins. they may, I think, be considered as on the whole successful. The improved gliding angle may possibly be traced to the more efficient disposition of surface which can be obtained with this type. They are, perhaps, slightly inferior to the Dunnes in stability, but not to any marked extent. I found vertical fins quite ineffective on both these types, which are, I believe, different applications of the same principle. They can, in fact, be flown in the same way, and the same phenomena traced to almost identical causes. By adding a little more weight, and the judicious cutting down of plane area, the speed of these models may be considerably increased, but generally at the expense of the gliding angle. I have often obtained very pretty effects by launching two or more of these models placed one above the other at the same time, care being taken to put the lightest model on top.

I wanted, however, to obtain a type which could be used satisfactorily for gliding from hills or good outdoor slopes. My models so far had been too light, and without sufficient directive sense.

I therefore slightly increased the span, which necessitated the use of a light stiffener, and to increase the weight I added a body which at the same time would give a certain amount of directional sense to the model. The sealing wax weight was carried inside the body, which is as far as possible of streamline form; a rudder and fin were added to counteract the effect of the projecting "nose" in front, and as a result I obtained glides of over 20 secs. duration in quite a fair breeze from my "aerodrome" in Richmond Park. In this type of glider I found the Weiss models superior to the Dunnes. When gliding into the wind the models keep remarkably straight, and I have had more than one instance of models gaining altitude by up currents. At Harnham, near Salisbury, one glider rose to a height of over 30 ft., and after a glide of well over half a minute (I had not a stop watch, unfortunately), landed ten or more feet higher than the starting point. The models, being made only of paper, do not, of course, last very long, about a fortnight being their average life, but considering that the most elaborate take but a quarter of an hour to twenty minutes to construct, one cannot expect them to. I once obtained a glide of 51 ft. 3.5 ins. with one of these when launched from the hand on level ground against a very slight breeze, the average being about 45 ft. This is, of course, nothing wonderful, but is quite good enough to give very good glides off a fairly steep hill. The increased weight and speed of the heavy type far outweighs shortcomings in gliding angle when there is any wind at all. From my experiments as so far conducted, I have come to the following conclusions:—

(1) That single plane models of the Dunne or Weiss type are the most satisfactory. (2) That these models will not fly without a decided down turned leading edge. (3) That the main surface of the plane should have no angle of incidence. (4) That negative tips must not be too large in relation to the rest of the model. (5) That fast models are more satisfactory than slow ones. (6) That the weight should be well forward. (7) That the c.g. must be low rather than high. (8) That the wing tips must be depended on for control more than fins or rudders. (9) That the models turn automatically if started with a bank, or so adjusted as to bank themselves. (10) That in models without a "body" no fins are needed, but when one is fitted a counteracting fin is needed. Generally speaking, a stiffener is required only in models of over 8 ins. span. I may add that all the designs submitted can be cut from any suitable piece of notepaper. As a matter of fact, three of the smaller gliders may be cut from a single sheet. When stiffeners are used, they should be cut from wood spills and seccotined to the plane.

In my more finished models I varnish the body, but it is not essential. I am proud to be able to say that I have interested more than one person in aviation by my small attempts.

Mr. F. Handley Page's Coming Lecture.

Considerable interest, from an aeromodelist's point of view, is centred in the above lecture on "The Dependence of Aviation on Experimental Model Work," at Caxton Hall, Westminster, on January 9th, and the attendance will, we expect, be a very large one. The chief point of interest probably lies in the fact that the lecturer is so well known in connection with his practical as well as theoretical work relative to full-size machines. In consequence, the pronouncement of his opinions with respect to the value of model work as bearing upon full-size design will be awaited with no little expectancy.

The Coming Exhibition at Olympia.

Aeromodelists who have any intention of exhibiting at the above, which will be held from March 16th to 25th next (both dates inclusive), should already be at work. Full particulars must be sent in by March 4th, to ensure insertion in the official catalogue, after which date no entries will be accepted. Everything sent by rail, &c., must be sent *carriage paid*. Members of the K. and M.A.A. pay a special fee of 2s. 6d. per model, other exhibitors 5s. Every exhibitor will be provided with a free pass to the Exhibition during the whole period. Exhibitors can either exhibit as competitors or non-competitors, i.e., their models are for exhibition but not competition.

Some little difficulty appears to have arisen with regard to the "loading" question (to which reference has already been made in this section), and the writer has been asked to explain it. Judging from the leaflets sent out to intending exhibitors, there does not appear to be anything in the nature of an explanation really required—save in one point only. A minimum loading of 4 ozs. per sq. ft. in the case of monoplanes, and of 3 ozs. per sq. ft. in the case of biplanes, means that if your model weighs *complete*, say, 12 ozs., then, if a monoplane, it must not have aggregate sustaining surfaces *greater than* 3 sq. ft., or if a biplane of *more than* 4 sq. ft. This applies to classes 2, 3, and 5, but not apparently to 6—weight-carrying models, since no mention is made of the same. There is, I suppose, the difficulty of the non-lifting tail area, although I have not personally heard this mentioned.

With respect to this I cannot at present make any statement, save that I should certainly vote for it being reckoned as part of the sustaining surface, since at times, at any rate, it undoubtedly acts as such.

A "Record" Quick Rising Model.

"The following may be interesting to readers of the Model section of FLIGHT," writes Mr. Clifford W. Tinson (Bristol): "A friend and I recently decided to try and build a model, which would get off the ground in less than a metre, there being no restrictions as to size, &c. I have been successful in doing this, the shortest run being 2 ft. 6 ins., or considerably less than two and a half times the length of the model, which is 14 ins. over all. So far as I know this is a record, though I think it is quite possible, with a little care, to reduce this to half that figure. The flights were all indoor ones, so there is no question of wind."



KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

British Model Records.

Single screw, hand-launched	Duration	D. Driver...	85 secs.
	Distance	R. Lucas ...	590 yards.
Twin screw, do. ...	Duration	G. Hayden ...	137 secs.
	Distance	W. E. Evans ...	290 yards.
Single screw, rise off ground	Duration	W. E. Evans ...	64 secs.
	Distance	L. H. Slatter ...	365 yards.
Twin screw, do. ...	Duration	J. E. Louch ...	2 mins. 40 secs.
Single-tractor screw, hand-launched	Duration	C. C. Dutton ...	266 yards.
	Distance	J. E. Louch ...	91 secs.
Do., off-ground	Duration	C. C. Dutton ...	190 yards.
	Distance	J. E. Louch ...	94 secs.
Single screw hydro., off-water	Duration	L. H. Slatter ...	35 secs.
Single-tractor, do., do.	Duration	C. C. Dutton ...	29 secs.
Twin screw, do., do.	Duration	L. H. Slatter ...	60 secs.

Aero Exhibition.—Will all intending competitors send in their names to the hon. sec. at once, so that an idea of the space required can be estimated? Also will all hon. secretaries who wish a stand reserved for their club write stating if possible size of stand required?

Sealed Handicap Competition.—This competition was held on Wimbledon Common on Saturday, 20th ult., but did not attract a large entry. The result was:—1st, A. F. Houlberg, scratch; 2nd, F. W. Jannaway, 5 secs.; 3rd, L. D. C. Chown, 15 secs.; 4th, H. Bond, 5 secs. The judges were Mr. L. Ingram and the hon. sec.

Lecture and Discussion.—Will all affiliated clubs secretaries advise the hon. sec. of the number of seats they wish reserved for their members at the discussion on the 9th inst.?

Greeting.—The president, Sir John C. Shelley, wishes the Association and the members a prosperous New Year, and he also hopes that all will do their utmost to increase the membership and so strengthen its hands.

27, Victory Road, Wimbledon.

W. H. AKEHURST, Hon. Sec.

AFFILIATED MODEL CLUBS DIARY AND REPORTS.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Bristol and West of England Aero Club (Model Section) (42, ROYAL YORK CRESCENT, CLIFTON, BRISTOL).

Club Diary.—Jan. 3rd, conclusion of r.f.g. duration competition at Sea Walls, 3 p.m., or following Saturday if the weather is unfavourable. Jan. 10th, steering contest at 3 p.m., at Sea Walls. Jan. 14th, general meeting in club-room, 8 p.m., when members intending to exhibit at the Olympia Aero Show are asked to make a special effort to attend.

November and December Report.—On Saturdays, Nov. 22nd and 29th and Dec. 13th, 20th and 27th, a duration competition was contested on the Downs, the following members competing:—R. T. Howse, L. J. Jacques, E. Martin, A. E. Pearce, W. A. Smallcombe and N. Gordon Stephens. The durations leading on Dec. 27th were:—W. A. Smallcombe, 46 secs. and 42 secs.; and R. T. Howse, 40 secs. On Nov. 22nd, a flight of 55 secs. was made by R. T. Howse's h.l. model, this being at present the longest flight over level ground timed by an official observer. Two flights of 60 secs. have, however, been timed at the gliding fields at Keynsham and Portbury, the model in one case disappearing from view. On Dec. 27th, R. T. Howse's small twin-screw model made several flights, in each of which it looped-the-loop three times. W. A. Smallcombe's single-screw model was also induced to loop-the-loop. Two flights were made by models carrying "electric sparklers," the effect of these little fireworks being very good. These sparklers can set anything on fire, and as they keep alight in any wind for 30 or 40 secs. they are well adapted for illuminated flying.

Croydon and District Ae.C. (158, HIGH STREET, CROYDON).

Monthly Report.—December has been one of the busiest months of the year with this club. A great deal of valuable work has been done, the majority of the models used being heavy ones. Members of this club do not cut down the weight of their models to the absolute minimum in order to obtain the greatest possible duration, as most of them think that a middle or heavy weight model demonstrates the efficiency of plane surface, shape, camber, propellers, stability, general design, &c., far more effectively than does a light one. A noticeable feature of the month's flying has been the low altitude at which the models have flown (with a few exceptions). Possibly this is owing to the damp and misty atmosphere experienced at Mitcham during the winter months, but whatever the cause may be the models have shown a distinct aversion to climbing. Hydros: Messrs. Bell, C. Smither, Pavely and Hart have been prominent with these models. A competition was held on Mitcham Common for duration on Dec. 7th, under almost impossible conditions, the models being repeatedly blown over. However, this competition was won by Mr. P. Hart with 25 secs., which was not bad under the circumstances. Mr. H. Smither has had splendid flights with his hydro., his average being over 40 secs., as also have Messrs. Bell and Pavely. Tractors: A fine tractor monoplane has been made by Mr. S. Mullins, with which he has obtained flights of over 300 yds. with very good duration. Mr. H. Smither out with a new tractor with complicated though thoroughly efficient chassis. Very spectacular flying has been put up by Mr. Bell's tractor biplane. H.l. models: Mr. C. Smither has distinguished himself by constructing a model that loops-the-loop and then flies for approximately 300 to 400 yds. distance. Mr. Bell has also been out for distance, and has obtained flights of 400 to 600 yds. Probably one of the best flyers yet seen at Mitcham is Mr. H. Smither's single-screw model, with which he has obtained 74 secs., though the model was not built for duration. Its stability and gliding angle is excellent. Mr. Carter has done well with his various models, though his new duration 'bus requires tuning up. There was very little flying at Christmas. Messrs. Bell and Mullins were out on Christmas Day, and obtained good flights with their respective tractor models.

Leytonstone and District Aero Club (64, LEYSPRING ROAD).

JAN. 4TH, flying, 10 a.m., on Wanstead Flats as usual. If wet meet at club-room. Jan. 7th, general meeting, 7.30 p.m., at clubroom. Will all members try and be present at the Model Engineer Exhibition? Prize distribution, Jan. 9th, 7.30, Caxton Hall.

Monthly Report.—On Nov. 30th 26 members met on Wanstead Flats. Messrs. H. Bedford, S. C. Hersom and F. E. Grattan were flying hydros., Mr. Bedford obtaining 42 secs. Tractors were flown with varying success by Messrs. G. Hawthorn, L. McCulloch, H. Bedford and F. Grattan. Six r.o.g.'s were in evidence, flown by different members, and ten h.l. models, the best duration being 80 secs. by Mr. F. E. Grattan. On Dec. 7th only 18 members assembled, but the flying was very good. Mr. H. Bedford obtained 46 secs. with his hydro., and Mr. F. Hawthorn 43 secs. also with hydro. Tractors were flown by Messrs. H. Bond, L. McCulloch, H. Bedford and F. E. Grattan. By hand-launching his model Mr. Bond obtained 50 secs. R.o.g.'s were flown by Messrs. F. Hawthorn, 43 secs., H. Bond, B. Ludlow, C. Hersom, 102 secs., T. Kimpton, 50 secs., and J. E. Louch, who had six flights all over 200 secs., the best being 132. Ten h.l. models were flown during the morning, the highest durations being obtained by Mr. S. C. Hersom and Mr. J. E. Louch. There was a meet of 21 members on Dec. 14th. The weather was unfavourable, but the flying was good, although no durations were taken. Messrs. F. Hawthorn and H. Bedford again accounted for the hydros., both models flying well. Five tractor models were flown, four as last week, and an additional one by Mr. W. Riggs. Six r.o.g.'s were flown by different members, and also eight h.l. models. Dec. 20th was remarkable for the splendid tractor flying. No durations were taken, but there was a Caudron (almost scale) by Mr. W. Hersom, a Handley Page by Mr. G. Hawthorn, a Weiss by Mr. F. Hawthorn, and three others by Messrs. S. C. Hersom, H. Bedford and F. E. Grattan, which were fitted with rectangular wings. All six were rising from the ground and flying high and well. During the morning four were in the air at one time, the result being very spectacular and much appreciated by the crowd. R.o.g.'s were flown by Messrs. F. Wood, S. C. Hersom, F. Hawthorn and H. Bedford. Seven h.l. models were in evidence, and Mr. F. Hawthorn flew his hydro. On Dec. 25th two competitions were held. Members of Section "A" competed with 6-oz. tractors. There were only six entries, and the results were rather poor, both being accounted for by very unfavourable weather. The prizes, which were presented by Mr. Thos. Kimpton, were awarded as follows: Mr. F. E. Grattan, 1st, with 15 points; Mr. H. Bedford, 2nd, with 10 points; and Mr. F. Hawthorn, 3rd, with 7 points. The Section "B" competition was for h.l. models, and also attracted an entry of six. The prizes were awarded as follows: Mr. F. Wood, 1st; Mr. L. McCulloch, 2nd; and Mr. A. Hoare, 3rd. Mr. H. Green was obtaining flights with a tractor model which he had built too light to enter the competition, and r.o.g.'s were flown by Messrs. S. C. Hersom and F. Wood. On Dec. 28th the weather was again very unfavourable, and only 17 members assembled. Messrs. W. Hersom, F. Hawthorn, H. Bedford and F. Grattan were flying tractors with varying success. Mr. F. Wood was obtaining some

good flights with his r.o.g., and ten h.l. models were flown by various members during the morning. The weather throughout the month has been very much against model flying, but the majority of members are enthusiastic, and the club is doing a deal of good work.

N.E. London Model Ae.C. (47, JENNER RD. STOKE NEWINGTON, N.)

THE annual general meeting will be held early in January; members will be notified by post, as date and place have not been settled. Unfortunately, it has been found necessary to reorganise the club, and we hope all our supporters will do their best to assist the reorganisation committee.

Monthly Report.—Mr. Dore has been doing very consistent work with his 9-oz. 'bus, but unfortunately lost it during an illuminated flight several weeks back. F. Burton's ungeared tractor is a very effective high flyer, with a duration average of 50 secs. F. Burton has also been giving looping demonstrations, obtaining eight successive loops. A. Lewin has been flying single and twin-screw machines with very satisfactory results. B. H. Longstaffe has been able to reduce power on his 10-oz. 'bus by double-surfacing the main plane. The camber of the underside is approximately flat, and, together with a loading of 8 oz. per sq. ft., this model is exceedingly fast. P. Cowderoy and H. Sherrat have greatly improved in their work with twin-screws, also great promise is shown by J. Horwood and F. Ramsey with tractors and single-screws.

Paddington and Districts (77, SWINDERBY ROAD, WEMBLEY).

JAN. 3RD and 10th, flying at Sudbury, r.o.g. handicap. Annual general meeting at secretary's house, 6 o'clock. The balance sheet and report for 1913 will be read and presented for adoption, and a general discussion will include the club's programme for the Olympia Aero Show and the arrangements of the club for 1914 season.

Monthly Report.—Dec. 6th, raining slightly. M. Levy testing ornithopter, C. C. Dutton putting models through looping-the-loop and upside-down evolutions, F. W. Johnson tuning up twin-propeller r.o.g. model. The following week C. C. Dutton won the r.o.g. handicap, and incidentally gained the first superior certificate awarded by the club with a fine flight of 93½ secs. r.o.g. His other durations were 91, 86½ and 83 secs. W. Evans' best flight was 55½ secs. (single propeller), and F. W. Johnson's 50½ secs. Dec. 20th, r.o.g. handicap won by W. Evans with 65 points, F. W. Johnson 61, and M. Levy 55. Boxing Day, an inter-club contest between the Wimbledon Aero Club and Paddington Aero Club was held at Sudbury. Result, a win for Paddington. It was blowing half a gale, and in such adverse weather ordinary durations were out of the question. The best duration was by M. Levy (Paddington), the flexible wings of whose model appeared to give to every gust, thus maintaining the model on an even keel. Six members from each club took part. The return match was held on the following day on Wimbledon Common, and although the wind was still strong it was not so gusty. Paddington again won. Times were as follow:—For Wimbledon: Laing, 58 secs.; A. F. Houlberg, 56 secs.; Powell, 55 secs.; and Tucker, 33 secs. Average, 50½ secs. For Paddington: C. C. Dutton, 83 secs.; T. Carter, 54 secs.; W. Evans, 51 secs.; and M. Levy, 27 secs. Average, 53½ secs.

Reigate, Redhill and District (THE COTTAGE, WOODLANDS AVENUE, REDHILL).

Monthly Report.—The junior members' competition was won by Mr. Hooton with 38 secs., after fine flying in tricky air; Mr. Greenhead was second and Mr. Hoyle third. The latter had the misfortune to smash his biplane during previous tuning up; it should have given a good account of itself. He, however, procured a mono. from workshop for competition. Mr. M. Wilson smashed during competition. However, the competition was considered a success, as it has been the means of bringing these men forward. The prizes were:—First, electric torch, presented by Mrs. Neville Meier; second, 2s. 6d.; third, pliers. A prize of accessories has been kindly offered by Messrs. J. Bonn and Co., for which a periodical competition has been arranged. R.o.g. machines are to be used, and the existing club record of 45 secs. has to be surpassed before March 1st, 1914. An extremely interesting lecture has been given by Mr. Houlberg, and was much appreciated. It has been decided to exhibit at the forthcoming show at Olympia, also to enter the team contest. Mr. Sutton has been out with floating tail h.l., also 6-oz. and 9-oz. tractors loaded over 6 ozs. to 15 q. ft. His best result with floating tail was 544 yds.; this has been found to possess a great amount of inherent stability, he having launched it in all positions, including upside down, and it invariably rights itself; he has also carried out experiments on 6-oz. tractor with different tails and propellers, getting best results with "S" curve tail and 11 in. instead of 10 in. tractor screw; he has also had 300 yds. with 7-oz. r.o.g. Canard. Mr. Hoyle has built new type of fuselage for biplane, and has had good results; also with 7-oz. r.o.g. mono. Mr. Hooton has been doing good work with 7-oz. r.o.g. mono.; also 9-oz. r.o.g. biplane Canard, which had floating tail also, but has been improved by removing tail. Mr. Norton has been tuning up a "make up" h.l. mono. for the purpose of testing double surfaced plane and different propellers. The Wilson brothers have been getting 400 yds. and 35 secs. with 7-oz. r.o.g. monos. at Buckland, later improving this with different propellers and less power. Mr. Young has had 30 secs. with h.l. mono. at Salford. Mr. Kennard has also been tuning a r.o.g. mono. All members have been busy in workshop preparing for Rawson Cup competition and Bonn prize, not to mention Olympia. Mr. Greenhead has had 38 secs. with r.o.g. mono.

Wimbledon and District (165, HOLLAND ROAD, W.).

JAN. 3RD and 4th, 1914, flying as usual.

Monthly Report.—A good deal of flying has been done this month in spite of adverse weather. On Dec. 26th, an inter-club contest with Paddington and Districts was held at Sudbury, resulting in a win for Paddington. Owing to the inclement weather the durations obtained on either side were very poor. In the return match at Wimbledon, on the following day, the results were as follows:—For Paddington: T. Carter, 54 secs.; C. Dutton, 83; M. Levy, 27; W. Evans, 51—average, 53½ secs. For Wimbledon: A. F. Houlberg, 56 secs.; L. Tucker, 33; D. Laing, 58; F. Powell, 55—average, 50½ secs. Only four machines a side were flown, as two of the visiting team had unfortunate smashes. Great interest has been aroused by Mr. Easdale's large tractor, which has been out on several occasions. This machine, which weighs over 13 ozs., is 4 ft. long with a span of 4 ft.; the frame consists of a large section hollow-spar bound with fabric and supported on an elaborately sprung chassis. It gets off in fine style, climbing in large circles and gliding well when run out. The best duration so far is 47 secs., but it is expected that this will be exceeded at an early date, when a more suitable screw has been fitted. Mr. Hayden, who on Nov. 22nd captured the twin-screw h.l. record with a flight of 137 secs., has now fitted a chassis to his model; the best duration so far is 112 secs., but this was done in calm weather, and as the machine is very slow for wind this figure has not yet been exceeded. Mr. Houlberg has been flying a h.l. machine with his usual success, obtaining durations of over 100 secs., all his flights being made at a great height. Great interest is taken in the electric lamp for night-flying, with which he is now experimenting. The complete outfit weighs 1½ ozs., and his large machine takes this with ease. The lamp gives a good light, and for practical purposes is far superior to the "Sparkla" fireworks hitherto used. However, these latter are very suitable for spectacular flying, and several members, including Messrs. Laing, Powell, Easdale and Chown, have done some fine night flying. The best

durations thus obtained were: H.L., F. Powell, 83 secs., and r.o.g., D. Chown, 65 secs. Mr. Laing has had out two new twin-screw models. His new A frame machine is a very fine piece of work, the frame being composed of two channelled spars tapering at each end, and braced on top, and the wing, which is of bamboo, is very rigid, though light. The machine, which gets off in a very taking way, does about 65 secs. duration. He has also had out a machine with hollow spar of the "portmanteau" type, as introduced by Mr. Hayden, and this machine should do good durations when tuned up. Mr. Powell has continued his experiments with his large surfaced machines of 0-1-1-P2 type with great success, obtaining durations of 80 to 100 secs., flying very high and steadily. Fitted with a chassis one of his machines gave good results, the duration being about 60 secs. Mr. Tucker has had out a tractor of his usual type with geared motor, which showed signs of good durations, as it climbed very well, but unfortunately a collision with Mr. Laing's machine while rising from the ground fractured its main spar with fatal effect, the frame doubling up. Mr. Lych, a new member, has had out a well-built tractor machine with triangular fuselage, but the frame was unable to stand the strain of the rubber, giving way after a few flights. With his hollow-spar machine, however, he had better success, and when the original heavy tail was replaced by one of lighter construction, the machine flew well, the wing being of the swept-back type, giving good stability.

UNAFFILIATED CLUBS.

Edinburgh Aeronautical Society (41, DRUMSHEUGH GARDENS).

COL. MASSEY, C.B., of the Aerial League of the British Empire, is giving two lantern lectures on "The Development of National Aviation" in the Oak Hall, Edinburgh Café, Princes Street, on Thursday, Jan. 8th, at 3 p.m. and 8 p.m. Gen. H. T. Arbuthnot, C.B., R.A., in the chair. Admission is free, but there are a few reserved seats (price 1s.) to be obtained at the Café.

Finsbury and District (85, UPPER TOLLINGTON PARK, N.).

As an effort is being made to create a "tip-top" club, worthy of the North of London, new members—especially those with new ideas for experiments—will be welcomed, and should write the secretary.

Monthly Report.—Some good flying has taken place this month by Mr. Savage (with twin-screw machine), and Messrs. Steer (with "Steer's" monoplane), R. Mullins (Etrich type), H. Mullins ("M.G.M." model), B. H. Barnard (who, with his "seagull" wings, looped-the-loop), S. Gibbs ("M.G.M." monoplane), S. Pratt and S. C. Barnard. Mr. Essex (with his "switch-backers") and Mr. Dowsett have also made a good show. The new members enrolled this month include Mr. Savage (who early in 1913 carried off the Grahame-White Trophy and aeroplane tuition), Mr. Dowsett (of the Windsor Club), and Mr. Bell.

Liverpool Aero Research Club (62, CEDAR GROVE, LIVERPOOL).

THE hon. sec. will be pleased to hear from any reader interested in kites, as it has been suggested to form a section for same. In view of the approaching season, the club will be pleased to hear from intending members, the subscription per annum being at the nominal fee of 5s. payable quarterly.

Monthly Report.—Work is now mainly confined to workshops, tractor machines receiving a fair share of attention. Mr. Payne having in hand one of 30 in. span, 10 in. tractor screw, the chassis being very neat. G. Kilshaw just completed another 47 in. span, 8 in. chord, 15 in. propeller. The general meeting, November, provided considerable discussion. The visit of Mr. Bennet helped to make things interesting, for besides being a modelist of no mean degree, he is an accomplished kite-flyer. The suggestion made regarding the club possessing a petrol-driven model received approval, and will most likely be carried out. W. Beale has been making a series of experiments with electrical apparatus for models with encouraging results, G. H. Kilshaw trying an acetylene motor of ingenious design.

Scottish Ae.S. Model Aero Club ("ROCHELLE," LIMESIDE AVENUE, RUTHERGLEN).

JAN. 17TH and 31ST, Paisley Racecourse. All types.

S. Eastern Model Ae.C. (1, RAILWAY APPROACH, BROCKLEY).

JAN. 3RD, Woolwich Common, 3.30 p.m. until dusk. Jan. 4th, Blackheath, 7.30-10 a.m.; Lee Aerodrome, 10.30 a.m. to 12.30 p.m.

Monthly Report.—With the appearance of this report the S.E.M.Ae.C. celebrates its first year as a club, and it is a great pleasure to be able to state that it is in a very healthy condition with regard to its members, officers, and financial position, and the quantity and quality of the models turned out. In common with many other clubs, the S.E.M.Ae.C. is now embarking upon a more ambitious programme—in which the popularising of model aviation is a feature—and the managing committee take this opportunity of wishing its kindred clubs and aero modelists in general a Happy and Prosperous New Year, and many of them. In connection with the South-Eastern Trophy, it has been decided to hold the following competitions during 1914:—Jan.-Mar. quarter, weight-carrying competition for r.o.g. models of not less than 8 ozs. in weight. April-June quarter, an r.o.g. contest for models of a fixed weight and with a stated amount of surface. July-Sept., an r.o.g. and water biplane competition. Oct.-Dec., competition for r.o.g. twin-tractors. The first indoor exhibition will be held in the Central Hall, High Street, Peckham, on Thursday, the 29th inst.; every member is expected to exhibit, and will greatly facilitate the work of the organising committee by sending a complete specification of his exhibit to the hon. sec. before Saturday, the 24th inst. Despite the somewhat boisterous weather to which the past month has treated us, the attendances at the numerous flying exhibitions and meetings have been well up to the summer's average, and several new machines, new in both design and construction, have made their appearance. G. Brown has flown a h.l. twin-prop. mono. with very flexible double-surfaced planes, and a r.o.g. collapsible model fitted with a plane of rather unorthodox design. A tractor with a boat-shaped fuselage and a floating tail mono. have been flown by E. W. Brunton, and two rather large tractors by C. Beere. A. Beere has obtained some excellent flights from a diminutive tractor monoplane, and F. Beere has exhibited a similar model. A. F. Chinnery's "gull-wings" still maintain their high standard of efficiency; E. Campbell has flown another rather notorious tractor, while A. B. Clark's various monoplanes have been creating something like a sensation, one, an all-metal model, like B. C. Hucks, loops-the-loop with the utmost regularity, but once at the completion of a loop, it started to loop again, then turned over laterally and continued to fly in the ordinary way; another of his floating tail monoplanes has been going in for altitude, in which it has proved itself an adept. F. Dixon's "Wake-up England" r.o.g. "A" frame has been flying with its usual consistency, and F. W. Evans has been kept busy with a scale Blériot and a twin-prop. elevator leading mono.; a floating tail model has been exercised by S. E. Grimstone and a tractor by L. Hatfull, who has also flown a small single-prop. machine. A very efficient "A" frame, which includes "looping-the-loop" amongst its accomplishments, has been flown by W. Jones, and a similar mono. by C. H. Morgan, who has also flown a tractor. W. A. McLaughlin is still a devotee of the single-screw type of model, his latest design being over 4 ft. in length. A. D. Nicholls has had considerable success from a hollow spar floating tail monoplane and a twin-propeller 2-oz. biplane. The spectacular Morane-Saulnier mono. constructed by W. R. France is now reaching the end of its tuning-up tests and some good results are expected. F. Plummer's 4 ft. 3 in. hollow spar

machine is still on its best behaviour and has made some of the longest flights ever seen on Blackheath or Mitcham Common; the altitude of these flights was also very good. This member's huge tractor mono. (holder of South-Eastern Trophy) has also been greatly in evidence. Another particularly busy member is W. H. Westwood, who has flown numerous excellent tractors, a twin-tractor, and a twin-prop. elevator leading mono. G. Lee has had successful flights from an all-metal mono., and F. W. Edwards has flown various "A" frames, one with twin-geared propellers and another which climbs spirals.

Southend, Westcliff and Leigh Model Aero Club (96, VALKYRIE ROAD, WESTCLIFF-ON-SEA).

Monthly Report.—This club has made good progress during the month both in construction and flights, also greatly increasing its membership. A competition was held on Boxing Day for a trophy presented by a member, Mr. H. Watson, and was won by E. Prockter, H. C. Statham being second. The winner of the prize presented by Mr. Padgett was L. Ryan; winner of the prize presented by Mr. Statham, E. L. Gage. All doing excellent work.

Stony Stratford and District Kite and Model Ae.C. (OLD STRATFORD).

JAN. 2ND.—Buckingham Branch, discussional meeting. Topic: "Some points on Model Design." Jan. 16th.—Building evening; Stony Stratford and Wolverton, discussional meeting. Topic: "Designing for Olympia." Jan. 7th.—Building evening.

Monthly Report.—Nov. 19th, the second annual general meeting and an exhibition of models was held; the exhibits numbered 20 model aeroplanes and 4 kites. The election of officers was as follows: J. J. Atkinson, Esq., C.C., F.R.A.S., president; Rev. S. Cheshire and L. C. Hawkins, vice-presidents. Chairman, Mr. E. Brown. Ground and Asst. Sec., Mr. R. W. Elmes. Committee: Messrs. R. Benbow, T. Haseldine, H. Mennell and W. Palmer. Hon. Sec. and Treas., Mr. O. Hamilton, Junr. The club is able to report a balance in hand. There has been a fair amount of flying during the two months of November and December. Several members at Stony Stratford and Buckingham are trying new machines, the most active members being Messrs. Brandon, Palmer, Whitbourn, Elmes, Mennell and Hamilton. The following meetings have been held at Buckingham: two building evenings, two discussional meetings. Topics: "H.-L. Machines," and a paper on "The Building of the Model." Two meetings have also been held in connection with the parent club, the first being a building evening and the second discussional. Topic: "The Building of the Model." Dec. 27th, a members' competition was held at Buckingham, and the following competed: Messrs. Palmer, F. Whitbourn, B. Sturgess, W. Sturgess and O. Hamilton, Junr., and, in spite of a rough sale of wind, &c., Mr. Palmer 1st with 394 ft.; Mr. O. Hamilton, Junr., 2nd, 274 ft.; W. Sturgess 3rd, 248 ft. On the secretary's wish the judges' ruling was that the placing be Mr. Palmer 1st, Mr. W. Sturgess 2nd.



CORRESPONDENCE.

Aeronautical Courses for Students.

[1818] The letter from Mr. H. Posner, which you publish in your issue of December 20th, may give rise to two misapprehensions: (i) That the Northampton Institute is the only Polytechnic in England to offer to its students a complete aeronautical course. (ii) That the club which is to start operations during the course of the next year, under the auspices of the above Polytechnic, will be the first of its kind.

I shall therefore be much obliged if you will be good enough to do justice where justice is due, and to make it known—

(i) That the Regent Street Polytechnic was the first institution in the world to organise full and complete courses in aeronautical engineering; that these courses have been regularly held since the 1909-10 session; that they have always been very well attended, and that many Polytechnic students now hold responsible positions in the aeronautical industry; and that, in fact, the first officer to practise aviation in actual warfare (with the Italians in Tripoli) received his first aeronautical notions at the Regent Street Polytechnic.

(ii) That at the Regent Street Polytechnic there has been a flying club now for nearly two years; that a good amount of practical work, in actual construction and flying, has already been done by the members; and that, under certain conditions, those interested in the practice of aviation, but who do not follow the Polytechnic Aero-Engineering Course, may be admitted as members of the Polytechnic Flying Society.

L. BLIN DESBLEDS,
Lecturer in Aeronautical Engineering at
the Regent Street Polytechnic.

December 20th.

FLIGHT.

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